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BRITISH QUADRUPEDS.

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A

HISTORY

OF

BRITISH QUADRUPEDES,

INCLUDING THE CETACEA.

BY

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ILLUSTRATED BY NEARLY 200 WOODCUTS.

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TO
JOHN MORGAN, ESQ. F.L.S.

SURGEON TO GUY'S HOSPITAL,
ETC. ETC.

THIS WORK
IS AFFECTIONATELY DEDICATED

BY THE AUTHOR,

IN GRATEFUL MEMORIAL
OF A LONG AND UNINTERRUPTED
FRIENDSHIP.

P R E F A C E.

THE advantages of local Faunas are too generally understood and acknowledged to require any lengthened proof or illustration. It may indeed be doubted whether the study of the animals of particular tracts of country have not contributed, more than any other means, to the advancement of zoological knowledge, especially as regards those important branches of it, the geographical distribution of animals, and the influence of climate, of soil, and of other local circumstances, in determining the range of species, the changes of varieties, and the extent and periods of migration.

It is true that in few instances only will the animal productions of a single country furnish forth such a multitude of forms in any particular group, as shall constitute the basis of a satisfactory illustration of the whole plan of zoological arrangement; although in this respect the *Annulosa Javanica* stands a remarkable example of the riches of a single island, and of the talent and knowledge of its distinguished illustrators. But even in less favoured climates, and under our own ungenial and changeful sky, few persons are aware to what extent such domestic means of study exist, and how little we need be indebted to foreign aid in acquiring the first principles at least of zoological science.

But allowing the necessity of foreign importations for the acquisition of a knowledge even of certain principal groups in each class of animals, there is another important advantage in the cultivation of the Natural History of our own country which requires no such limitation;—an advantage which appeals with greater force in the present era of the general diffusion of knowledge than at any former period: and that is, the means which are thus offered to multitudes of persons

who are restricted by circumstances from engaging in the study of the higher departments of the science, of obtaining a rational and never-ceasing enjoyment; and to the young especially, of opening an exhaustless source of amusement, at once healthful to the body, and favourable to the elimination of the best qualities of the heart and understanding.

It is with these views that the series of works on British Zoology, of which the present volume forms a part, has been undertaken; and it is confidently hoped that the united labours of several British Naturalists,—each illustrating the departments to which his attention has been most particularly directed,—will produce a Fauna of this country far more complete than could have emanated from the unaided talent and exertions of an individual.

The classification which has been followed in the present work is such as appeared to the author the best adapted for the object immediately in view, although far from being unobjectionable if applied to the arrangement of the whole class. In the nomenclature of the families, he has adopted the name of the typical genus of each, with the Greek patronymic termination;—a rule which was first introduced by a society of Naturalists with whom he passed some of the happiest hours of his life, and which has now been employed for some years past by most of the Zoologists of this country. This attempt to establish a general rule of zoological nomenclature, although it has been much, and in some cases somewhat ludicrously misapplied, would, if correctly and consistently carried out, be productive of great accuracy and discrimination in the expression of the relative value of the different groups.

In the class of animals of which the present work professes to treat, although the British Islands are deficient in a few of the most important groups, yet most of the orders and many of the most illustrative families are represented by species either strictly indigenous, naturalised, or reduced to a state of domestication.

Amongst the *Primates*, (an important group distinguished by the existence of the three kinds of teeth, incisors, canines, and grinders, and by having pectoral teats,) the *Cheiroptera*, or Bats, are represented by fifteen certain and well-defined species, belonging to four genera, all of them of the insectivorous division of the group.

Of the true *Insectivora*, there are five species, comprised in three genera, amongst which the Mole stands pre-eminent as affording a higher degree of interest in its structure and habits than perhaps any other animal of the class.

In the *Carnivora*, we have good examples of all the five families of which this order is composed. The *Ursidæ*, or Bear tribe, are represented by one species only,—the Common Badger. The *Mustelidæ*, or Weasels, offer seven species. In the typical family, the *Felidæ*, or Cats, we have the Wild Cat and the Domestic. The *Canidæ* are exemplified in two species of different genera,—the Common Dog and the Fox. And of the amphibious family of this order, the *Phocidæ*, or Seals, there are now ascertained to be three genera, including five species.

The order of the *Rodentia*, or gnawing animals, contains fifteen British species, illustrative of four of the most important families, and including no less than four of the true *Leporidæ*, or Hares.

The domesticated Horse and Ass are the representatives of the whole-hoofed form, of which there is no native European species; and the Domestic Hog is the only animal now remaining which belongs to the true *Pachydermata*.

In the important order of the *Ruminantia*, the *Cervidæ* or Deer family, have three species; the *Bovidæ*, or Ox group—one, which is now nearly or wholly domesticated—and the *Capridæ*, two,—the Sheep and the Goat.

The seas which everywhere surround us also are occupied by a considerable number of the *Cetacea*, of which at least thirteen or fourteen species have been found around our

coasts, amongst which are not only the larger Whales,—the Balcen Whale, the great Rorqual (the largest of all existing animals), and two species of Cachalot, or Sperm Whale,—but many of the *Delphinidæ*, or Dolphin family, of which several are of the most interesting and rare species.

The whole catalogue amounts to not less than from eighty-five to eighty-eight species, of which ten are in a state of more or less complete domestication.

Of many of the native species, the author has endeavoured to define the characters more accurately than had previously been done, and to adopt as specific distinctions, whenever it was possible, the comparative dimensions of parts which are easily examined, and invariable in their size and form. Of all specific characters, he believes the most available and the most certain are those which are founded upon such comparative distinctions as these; they are at least far more so than the vague and merely positive attributes of length and breadth, or the variable one of colour.

The generic distinctions which he has employed are generally those of structure; and he has always considered those differences of structure which exercise a decided influence upon the habits of the animals, the only legitimate ground for such distinctions. It is impossible to lay down unexceptionable rules for the foundation of the essential characters of the various groups. Those parts which in one case afford distinctions of the utmost certainty, are in another absolutely valueless. The teeth, which both in form and number constitute the most unexceptionable characters in the whole of the higher orders of *Mammalia*, offer in the *Cetacea* but little assistance in the determination of genera, and still less in the discrimination of the higher groups.

The labours of former British Naturalists had rendered the task of determining and describing the species already known comparatively light. Much had been done by Pennant, — whose work, if not exhibiting any very extensive

knowledge of the more scientific part of his subject, is full of interesting information, and exhibits the learning and taste of an elegant scholar. The History of British Animals by Dr. Fleming consists of the essential characters, and a succinct history of the genera and species of the vertebrate, molluscous, and radiate divisions:—the scope of the work is comprehensive, and its execution reflects great credit upon the zeal and research of the author. But the book for which the British Zoologist has been laid under the greatest obligation is the Manual of British Vertebrate Animals, by the Rev. Leonard Jenyns, which, for the clearness of its details, and the accuracy and comprehensiveness of the generic and specific distinctions, has never been surpassed in any similar work. The Author would be unjust were he not to acknowledge how much he has been aided by this excellent compendium, which ought to be the constant companion of every one engaged in the investigation of the vertebrate animals of this country; and it is much to be desired that this excellent naturalist, or some one equally fitted for the task, would continue the plan into the invertebrate classes. Much, however, doubtless remains to be done in the investigation of British Mammalia. Many species may even yet have escaped the observation of Naturalists; and of those which are known, many points of the history of their habits are still only obscurely understood. The smaller animals of some parts of Ireland have been but little studied; and the coasts of that part of our dominions, as well as those of the North of Scotland, may yet be investigated with much reasonable expectation of adding to our information respecting the Seals and *Cetacea*,—two groups which are at present more imperfectly known than any others. The points to which the Author would especially direct the attention of those whose local circumstances enable them to enter upon this interesting investigation are, the determination of the species or varieties of the Seals, and their various habits, and especially the pre-

servation of their crania and feet where the whole animal cannot conveniently be retained. It is extremely probable that several specific distinctions may yet be discovered in animals of this family which would otherwise have been passed over as identical. Amongst the *Cetacea* farther information is required on many points of great interest:—the relation of the *Hyperoodon* of Dale to that of Hunter; the more careful examination of the species described by Sowerby, named in this work *Diodon Sowerbæi*; the characters of the High-finned Cachalot, first described by Sibbald, *Physeter Tursio*, and its structural relations to the Common Spmaceti Whale; and the determination of the species of the Rorquals, or Fin-backed Baleen Whales. The latter subject of investigation is one of considerable interest, as involving the consideration of the value of certain osteological characters which have hitherto been considered of the greatest importance. In the four instances in which the number of vertebræ belonging to these animals has been recorded, a most extraordinary difference is stated to have occurred,—no two of them having even nearly the same number. It is therefore of great importance that such facts should be accurately recorded whenever an opportunity offers.

The Author cannot take leave of his little book without expressing his sincere and grateful thanks to those kind friends who have aided him by many interesting communications, and by the loan of specimens. To his friends Messrs. Yarrell, Jenyns, Hogg, and Blyth—to Mr. Ball of Dublin, to the Rev. Mr. Barclay and Mr. Bruce of Shetland, and many others, his thanks are especially due; and he cannot but felicitate himself on the delightful intercourse which the progress of his work has enabled him to enjoy with so many of his distinguished fellow-labourers. He also feels bound to acknowledge how much the work is indebted to the artists, Mr. Dicks and Mr. Vasey, by whom the whole of the illustrations have been drawn and engraved.

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NOTICE ON *Sorex araneus*.

SINCE the account of the Shrews was printed, circumstances have occurred which call for the correction of an error into which I had fallen, in common with almost every other British Naturalist, on the nomenclature of our common species. Some time since, Mr. Jenyns mentioned to me a paper by M. Duvernoy, in the second volume of the Transactions of the Natural History Society of Strasbourg on the Dentition and other characters of the Shrews, which had led the former gentleman to investigate the subject anew. The result of that investigation has been to prove beyond all doubt that the Common Shrew of this country, the *Sorex araneus* of English authors, is not the *S. araneus* of the Continent;—a fact of which Mr. Jenyns had before expressed a suspicion in his “Manual of British Vertebrate Animals.” An examination of the specimens of this genus in the British Museum, both English and foreign, in company with Mr. Jenyns, and a careful collation of them with the characters given by M. Duvernoy, have convinced me that Mr. Jenyns’s opinion is correct; and I have great pleasure in referring to his admirable and elaborate paper on the subject in the second volume of the Magazine of Zoology and Botany. The Prince of Musignano, also, has very lately assured me, that the *Sorex araneus* of the English authors is *not* that of Linnæus, as he has “taken especial pains to ascertain from Sweden.” Mr. Jenyns believes, with much probability, that our species is the *S. tetragonurus* of the Continental authors.

The article in question also contains some very judicious criticism on the other two British species of *Sorex*.

BRITISH QUADRUPEDS.

CHEIROPTERA — BATS.

Family, VESPERTILIONIDÆ.*— Genus, *Vespertilio*.

Generic Character.—Cutting teeth $\frac{3}{3}$; grinders variable;† nostrils without foliaceous appendages; ears at most very little longer, sometimes shorter, than the head, not united at the base.

THE genus *Vespertilio*, restricted as it now is by the necessary dismemberment of the large group which was formerly comprehended under this term, still retains a considerable number of species, of which no less than twelve are natives of this country, besides two species of *Plecotus*, one of *Barbastellus*, and two of *Rhinolophus*, making in all seventeen species of the order. From the difficulty of obtaining specimens of these nocturnal and timid animals, and the want of interest which naturalists have generally evinced respecting them, it is exceedingly probable that many more species will be found to be indigenous to our islands, especially when it is considered that a very few years since, not more than six Bats were enumerated as British.

* Insectivorous Bats, without nasal appendages.

† It is the *false grinders* only that vary in their number in the different species; the true grinders being always $\frac{3}{3}$.

The investigations of Kuhl, a young and enterprising German naturalist, whose premature death has disappointed the high expectations which his almost precocious acquirements and his excellent general views in zoological science had deservedly raised, had thrown much light upon the Bats of his own country ;* and, as may have been expected from the similarity of climate and of temperature, as well as from the propinquity of the two countries, several which he had first discovered in Germany, as well as others previously described, have since been found in different parts of Great Britain.

The species indigenous to this country, and indeed all the European ones, belong to the true insectivorous division of the order. The general habits of these are therefore similar, and may with advantage be detailed in this place.

The whole structure of these singular animals is evidently and admirably calculated for the exercise of considerable powers of flight. In this point of view, they form not only a very distinct and circumscribed group within themselves, but in fact there exists no other type amongst the different classes of vertebrated animals, excepting of course the whole class of Birds, on which any separate group is modelled, having similar powers, or offering any distinct analogical relation to them. The expansion of skin extended between the anterior and posterior extremities of the Colugo, *Galeopithecus*, a genus formerly referred to the present order, but which properly belongs to the Quadrumana,—of the Flying Squirrel, *Pteromys*, amongst the Rodentia, and the Flying Opossum, *Petaurista*, amongst the marsupial animals; the increased developement of the fins in the Flying Fish, *Exocetus*, and the cutaneous web supported by the elongated ribs in the Flying Lizard, *Draco*,—are all of them examples of an expan-

* “ Die Deutschen Fledermäuse, von Heinr. Kuhl.” Neue Wetter. Anal. I. Bd.

sion of the integument upon certain bones, for the purpose of enabling these animals to take long and somewhat sustained leaps: but to the performance of this one action each of these structures is strictly limited. There is no instance of a quadruped, a fish, or a reptile, sustaining itself in the air by a succession of impulses given by any such organs as those now alluded to. But in the Bats, the whole structure is obviously modified to the fulfilment of this object. The sternum, the ribs, and the bones composing the shoulder, are all developed for the attachment of powerful muscles, adapted to the rapid and continued movements of the anterior extremity, which, although consisting essentially of the same parts as that of man, has its different bones so modified in form and extent, as to afford the most admirable and complete support to an extensive expansion of the skin, which thus forms a perfect and efficient pair of wings. This modification principally consists in the extraordinary development of the fingers, which are greatly elongated for the purpose; and upon which the skin is stretched like the silk on the rods of an umbrella. The skin which forms the flying membrane is exceedingly thin, generally devoid of hair on both sides, and is furnished with very slender transverse bands in every part; it extends not only between the elongated fingers, but from the last finger to the posterior extremity, and from this to the tail. That portion which is situated between the hinder legs, and in which the tail is included, is termed the interfemoral membrane: it is probably intended to act as a sort of rudder, in rapidly changing the course of the animal, in the pursuit of its insect food; a view of the use of this part, which is strongly supported by the fact, that in a large group of foreign Bats which feed on fruits or other vegetable substances, as well as in some of carnivorous habits, but whose prey is of a less active character, this part

is either wholly wanting, or much circumscribed in extent and power.

Of the fingers of the anterior extremity, the thumb is the only one which is left free; it is of moderate length, and furnished with a hooked nail. The hinder toes are short, of nearly equal length, and are chiefly used as suspending organs, the Bats hanging by them, from the trees or walls on which they rest, with the head downwards.*

The flying membrane is not the only part which indicates a tendency to an extraordinary development of the cutaneous system. The ears and the nose exhibit in many cases a curious conformation, consisting of the great expansion of the former, and some remarkable appendages to the latter. The ears are, in all the British Bats, of considerable extent; and the tragus is of large size in those in which the nasal appendages just alluded to do not exist: in the Long-eared Bat, the ear is nearly as large as the body, and the tragus very long; but in the *Rhinolophus*, or Horse-shoe Bat, though the ears are large, the tragus is not perceptible; and there are certain very curious foliaceous appendages to the nose, which will be described hereafter.

Admirably as the structure which has just been detailed is adapted to the purposes of flight, we shall find that, of the different parts of which it is composed, the osseous basis for the support of the membrane, and the membrane itself, are both applicable to other purposes than those to which they may appear to be primarily destined. The flying membrane is frequently used as a cloak or mantle, in which not only these little creatures enshroud themselves, but in which the females hold and shelter their young; the posterior portion

* The figure at page 11 is a representation of the Long-eared Bat, *Plecotus auritus*, in this position; the long ears being folded under the arms, and almost wholly concealed by them, whilst the tragus is exposed and pendulous.

of it, or interfemoral membrane, is also stretched forwards and expanded, by means of the tail and thighs, during parturition, forming a safe and easy cradle into which the young ones are received at the moment of their birth.

But there is another, and still more important and interesting office, which the membrane of the wings appears to perform, and which deserves especial notice. Spallanzani had found that Bats, when deprived of sight, and, as far as possible, of hearing and smelling also, still flew about with equal certainty and safety, avoiding every obstacle, passing through passages only just large enough to admit them, and flying about places previously unknown, with the most unerring accuracy, and without ever coming into collision with the objects by which they passed. He also stretched threads in various directions across the apartment with the same result. So astonished was he at these curious facts, that he was led to attribute the phenomenon to the possession of a sixth sense, unknown to us. Cuvier was the first to appreciate the real value of these experiments, as affording a proof of the existence of a vast expansion of the most exquisite sense of touch over the whole surface of the flying membrane; the naked surface and delicate structure of which appear well calculated to form the seat of so important a function. From this view, therefore, it would appear, that "it is by means of the pulsations of the wings on the air that the propinquity of solid bodies is perceived, by the manner in which the air reacts upon their surface." The transverse bands before mentioned as traversing the whole of the flying membrane, are formed of small thickened points, which have very much the appearance of minute glands, particularly on the interfemoral portion. Have they any connexion with the extraordinary sensibility of the membrane just alluded to?

Although the extremities are adapted, in their most ex-

tended action, only for the purposes of flight, yet they are capable of affording the means of walking on the ground, and still more, of climbing with great ease up perpendicular places, if there be sufficient inequalities on the surface to allow of a firm hold by the little hooked nail of the thumb. In walking, the wings are closed, the long fingers being folded against the arm, and the animal rests upon the wrist. The foot of one side is then extended forward, and the thumb-nail is hooked into the ground; the body is next raised by means of the hinder foot, which has been placed partly under the body, and thus thrown forward; the other side is next propelled in the same manner: it is therefore by a succession of these plunges that their progression on the ground is effected, which is sometimes sufficiently rapid to deserve the name of running. This action, it must be acknowledged, is but a ludicrous attempt compared with the progression of other quadrupeds; but it is sufficient for their wants. Indeed, the habit of judging of the comparative value and importance of a structure by viewing it only in those forms in which it is most extensively developed, is liable to give very erroneous notions of the general adaptation of structure to its function, the contemplation of which constitutes the great charm and interest of all natural science; and it cannot be too strongly urged, that the apparently imperfect and abortive means of terrestrial progression given to the Bat and the Sloth are as indicative of infinite wisdom as the power of the Lion or the fleetness of the Antelope, because it is equally fitted to their requirements.

The Bats are all of them nocturnal or crepuscular in their habits. Sleeping during the day in the most retired places, some of them in the darkest retreats of forests, in the hollows of trees, or suspended from the bark; others in the most inaccessible parts of ruined edifices, in the roofs of churches, or

similar unfrequented places; they come abroad as soon as the twilight begins to steal over the face of nature, and to offer them the safeguard of obscurity. Then in the pursuit of those insects which, like themselves, avoid the glare of daylight, they exhibit the most rapid and various movements, sometimes flying with great swiftness over the surface of the water, then rising to considerable height in the air, and turning suddenly to one side or the other, as their prey performs its various gyrations to escape from them. These easy and graceful evolutions present an interesting scene, in perfect harmony with the quiet of a calm summer evening, and possessed of sufficient animation to relieve the sameness and gloom of the hour, without interrupting its stillness and tranquillity.

Do our Bats ever migrate? or do Swallows ever hibernate? To both these questions I doubt not the same unqualified negative must be given. Their winter absence from the scenes which their summer presence and activity had enlivened, must be attributed to exclusively distinct causes. The Bats hibernate; the Swallows migrate. The hibernation of these animals is indeed one of the most interesting points in their economy. At an earlier or later period of autumn, according to the species, they retreat, generally in large congregations of various species together, to the most retired places; as under the roofs of houses and churches, in caverns, in the hollows of trees, and similar situations, where they suspend themselves by their hinder claws, with the head downwards. Here they crowd together, holding not only by the surface of the walls of their retreat, but by each other, one crowding over another so closely that it appears scarcely possible for such numbers to occupy so small a space. The retirement of the different species takes place at very different periods of the year. The Noctule is seldom seen abroad much

later than July ; and the *Pipistrelle*, the most common of our indigenous Bats, will sometimes make its appearance, in fine mild weather, in almost every month in the year ; it does not even restrict itself to the obscurity of evening, but may now and then be seen flitting about in the bright sunshine of a December day, in search of the few insects which the unwonted influence of his rays has called into a short-lived activity.

The female Bat brings forth one or two young at a birth, which she nurses with great tenderness and care, carrying it about with her, and holding it enshrouded in her ample cloak, which preserves it from all intrusion. During the period of breeding, some species are observed to pair ; and Geoffroy St. Hilaire states, that whilst the female is suckling, the male places himself in front of the mother, so that the young one may be equally protected and warmed by both the parents at the same time.

It is perhaps difficult to account for the prejudices which have always existed against these harmless and interesting little animals, which have not only furnished objects of superstitious dread to the ignorant, but have proved to the poet and the painter a fertile source of images of gloom and terror. That the ancient Greek and Roman poets, furnished with exaggerated accounts of the animals infesting the remote regions with which their commerce or their conquests had made them acquainted, should have caught eagerly at those marvellous stories and descriptions, and rendered them subservient to their fabulous but highly imaginative mythology, is not wonderful ; and it is more than probable that some of the Indian species of Bats, with their predatory habits, their multitudinous numbers, their obscure and mysterious retreats, and the strange combination of the character of beast and bird which they were believed to possess, gave to Virgil the idea, which he has so poetically worked out, of the Harpies

which fell upon the hastily-spread tables of his hero and his companions, and polluted, whilst they devoured, the feast from which they had driven the affrighted guests. But that the little harmless Bats of our own climate, whose habits are at once so innocent and so amusing, and whose time of appearance and activity is that when everything around would lead the mind to tranquillity and peace, should be forced into scenes of mystery and horror, as an almost essential feature in the picture, is an anomaly which cannot be so easily explained.

The views entertained, even by the most celebrated naturalists of antiquity, respecting the nature of these animals, were extremely vague. Aristotle himself, whose genius seems to have discovered, by an almost intuitive perception, the relations of natural objects, and the comparative value of external forms and structural characters, speaks of them as having feet as birds, but wanting them as quadrupeds; of their possessing neither the tail of quadrupeds nor of birds;—of their being, in short, birds with wings of skin. He is followed, but with increasing error, by Ælian and by Pliny; the latter of whom says, that the Bat is the only bird which brings forth young ones and suckles them.* Even up to a late period they were considered as forming a link between quadrupeds and birds. It were a vain and useless task to recount every slight modification of this pervading error. The time has long gone by when Nature was accused of the most extravagant vagaries by the professed investigators of her laws, and when the absurd expression of “*lusus naturæ*,” or other equivalent follies, was forced into their service to account for all the wonders which their own limited views and scanty information failed to explain.

* *Volucrum animal parit vespertilio tantum: **** eadem sola volucrum lacte nutrit, ubera admovens; geminos volitat amplexa infantes, secumque deportat.* Plin. Hist. Nat. lib. x. c. lxi.

The common language of our own ancestors, however, indicates a much nearer approach to the truth in the notions entertained by the people, than can be found in the lucubrations of the learned. The words *Reremouse* and *Flittermouse*, the old English names for the Bat, the former derived from the Anglo-Saxon "Aræran," to raise or rear up, and "Mus,"—the latter from the Belgic, signifying 'flying or flittering Mouse,'—show that in their minds these animals were always associated with the idea of quadrupeds. The first of these terms is still used in English heraldry; though, I believe, it has ceased to belong to the language of the country. The word *Flittermouse*, corrupted sometimes into *Flintymouse*, is the common term for the Bat in some parts of the country; particularly in that part of the county of Kent, in which the language, as well as the aspect and the names of the inhabitants, retains more of the Saxon character than will be found perhaps in almost any other part of England.

The characters which are most easily detected and least variable, and which are therefore the most available in the discrimination of the species of this genus, are the forms of the ear and tragus, and the relative proportions of the ear to the tragus and to the head. In reforming, in some measure, the specific characters, I have endeavoured to define these proportions more distinctly than has hitherto been done. It is remarkable that the formula of dentition and the form and structure of the tragus combine to point out two distinct groups of the genus. In the one, the tragus is more or less rounded at the tip, short, and a little thickened in its substance: the dentition is as follows:—

$$\bullet \text{ I. } \frac{3}{4} : \text{C. } \frac{3}{2} : \text{F. M. } \frac{4}{4} : \text{M. } \frac{3}{2} = \frac{12}{4}.$$

• I. incisives. C. canines. F. M. false molars. M. molars.

In the other form, the tragus is relatively longer, thin, narrow, and more or less pointed : the dentition—

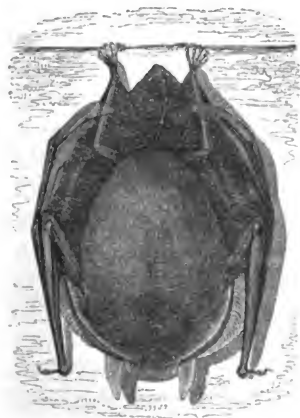
$$I. \frac{3}{4} : C. \frac{2}{2} : F.M. \frac{3}{3} : M. \frac{3}{3} = \frac{11}{11}.$$

To the first group belong *V. noctula*, *Leisleri*, *discolor* ? *pipistrellus*, *pygmæus* ? To the second, *murinus*, *Bechsteinii*, *Nattereri*, *emarginatus*, *Daubentonii*, *mystacinus*.

Serotinus, which has a short, semicordate tragus, has the following dentition, which differs from both the other groups :

$$I. \frac{3}{4} : C. \frac{2}{2} : F.M. \frac{3}{3} : M. \frac{3}{3} = \frac{11}{11}.$$

It will be seen that it is only the false molars which differ, the other teeth being similar in number in all the species of this genus.



CHEIROPTERA.

VESPERTILIONIDÆ.



THE GREAT BAT.

NOCTULE.

Vespertilio noctula.

Specific Character.—Ears oval-triangular, shorter than the head ; tragus not one-third the length of the ear, arcuate, terminating in a broad, rounded head ; muzzle short, broad, and blunt.

Vespertilio noctula, SCHREB. Säugth. p. 166, t. lii. DESMAR. Mammal. p. 156. FLEM. Brit. An. p. 6. JENYNS, Brit. Vert. p. 23.

„ *altivolans*, WHITE, Nat. Hist. Selb. XXXVII.

„ *proterus*, KÜHL, Deutsch. Flederm. p. 41.

La Noctule, DAUBENTON, Mém. Acad. 1759, p. 380, t. ii. f. 1.
BUFFON, Hist. Nat. VIII. p. 128, t. xviii. f. 1.

La Serotine, GEOFF. Ann. Mus. VIII. p. 194, sp. 4.

Great Bat, PENNANT, Brit. Zool. I. p. 146, t. xiii.

IT is to Daubenton that we are indebted for the discrimination of this fine species of European Bat. He has described it and given a figure of the head, in the Memoirs

of the French Academy for 1759 ; and Buffon subsequently gave it a place in his great work. The first notice of its occurrence as a British species is in White's Natural History of Selborne, in which it is repeatedly mentioned. This writer gave it the name of *altivolans*, from a peculiarity which did not escape this close observer of nature.

The Noctule is gregarious in its habits, associating in considerable numbers, and seeking its retreat sometimes in the hollows of trees, at others under the roofs and eaves of houses. Pennant states that he was informed by the Rev. Dr. Buckhouse, that he saw taken from under the eaves of Queen's College, Cambridge, one hundred and eighty-five in one night : but as there is no reason to believe that these were all submitted to the rigid examination necessary to detect the specific distinctions of these animals, it is probable that other species were mingled with them in this great congregation. It is however particularly stated, that of all those which were measured, the extent of the wings was fifteen inches. In the second night, sixty-three were taken. The flight of this Bat is remarkably high and rapid, and its cry when on the wing is sharp and harsh. It was observed by White to emit a very offensive odour. It remains in activity for a shorter time than any other, coming abroad later and retiring earlier : White says that he never saw it till the end of April, nor later than July. This difference between the habits of the Noctule and the Pipistrelle is the more remarkable, as in their zoological character they strikingly resemble each other, excepting in size.

Some observations by Mr. George Daniell, recorded in the Proceedings of the Zoological Society for 1834, on the habits of this species, and particularly on its parturition and lactation, are too interesting not to demand insertion here ; and I feel that it would be doing injustice to the very pleasing

manner in which the facts are detailed, were I to omit any part of them. "On the 16th of May 1834, Mr. Daniell procured from Hertfordshire five specimens of the *Vespertilio noctula*, four females and one male. The latter was exceedingly restless and savage, biting the females, and breaking his teeth against the wires of the cage, in his attempts to escape from his place of confinement. He rejected food, and died on the 18th. Up to this time the remaining four continued sulky; but towards evening they ate a few small pieces of raw beef, in preference to flies, beetles, or gentles, all of which were offered to them; only one of them, however, fed kindly. On the 20th one died, and on the 22nd two others, each of which was found to be pregnant with a single fœtus. The survivor was tried with a variety of food, and evincing a decided preference for the hearts, livers, &c. of fowls, was fed constantly upon them for a month. In the course of this time large flies were frequently offered to her, but they were always rejected, although one or two May-chafers, *Melolontha vulgaris*, were partially eaten. In taking the food, the wings were not thrown forward, as Mr. Daniell had observed them to be in the *Pipistrelle*; and the food was seized with an action similar to that of a dog. The water that drained from the food was lapped; but the head was not raised in drinking, as in the *Pipistrelle*. The animal took considerable pains in cleaning herself, using the posterior extremities as a comb, parting the hair on either side from head to tail, and forming a straight line along the middle of the back. The membrane of the wings was cleaned by forcing the nose through the folds, and thereby expanding them. Up to the 20th of June the animal fed freely, and at times voraciously; remaining during the day, suspended by the posterior extremities, at the top of the cage, and coming down in the evening to its food: the quantity eaten

sometimes exceeded half an ounce, although the weight of the animal itself was no more than ten drachms. On the 23rd, Mr. Daniell, observing her to be very restless, was induced to watch her proceedings. The uneasiness was continued for upwards of an hour; the animal remaining during all this time in her usual attitude, suspended by the posterior extremities. On a sudden she reversed her position, and attached herself by her anterior limbs to a cross wire of the cage, stretching her hind legs to their utmost extent, curving the tail upwards, and expanding the interfemoral membrane so as to form a perfect nest-like cavity for the reception of the young. In a few moments the snout of the young one made its appearance, and in about five minutes the whole of its head was protruded. The female then struggled considerably until the extremities of the radii had passed; after which the young one, by means of a lateral motion of its fore limbs, relieved itself. It was born on its back, perfectly destitute of hair, and blind. The mother then cleaned it, turning it over in its nest; and afterwards resuming her usual position, placed the young in the membrane of her wing. She next cleaned herself, and wrapped up the young one so closely as to prevent any observation of the process of suckling. The time occupied in the birth was seventeen minutes. At the time of its birth, the young was larger than a new-born mouse; and its hind-legs and claws were remarkably strong and servicable, enabling it not only to cling to its dam, but also to the deal sides of the cage. On the 24th, the animal took her food in the morning, and appeared very careful of her young, shifting it occasionally from side to side to suckle it, and folding it in the membranes of the tail and wings. On these occasions her usual position was reversed. In the evening she was found dead; but the young was still alive, and attached

to the nipple, from which it was with some difficulty removed. It took milk from a sponge, was kept carefully wrapped up in flannel, and survived eight days; at the end of which period its eyes were not opened, and it had acquired very little hair. From these observations, it is evident that the period of gestation in the *Noctule* exceeds thirty-eight days."

This Bat is the largest of the British species, excepting *V. murinus*, which exceeds it in length by about half an inch. The head is flat and broad; the muzzle broad, obtuse, and nearly naked; the mouth wide; the nostrils tumid at the upper and inner margin, and slightly channelled on the outer side. The ears are wide apart, shorter than the head, oval, the external margin with a rather deep fold near the base, from which it is produced downwards and forwards, below the corners of the mouth. Tragus very short, narrow at its base, then suddenly expanded into a broad, rounded, or reniform head, which is rather thick, and covered with numerous minute papillæ. Fur soft, moderately long. The tail longer than the fore arm, its termination curved inwards, and projecting rather more than a line beyond the interfemoral membrane, which is thicker and more opaque than the other parts of the flying membrane, and is furnished with about fourteen or sixteen transverse lines. The colour of the fur is a reddish brown, scarcely darker above than beneath; the ears, muzzle, and membrane, dusky,—the latter darker and thinner towards its margin.

It is remarkable that Geoffroy has described this Bat under the name of *Serotine*, and the latter under that of *Noctule*, in his paper on the genus *Vespertilio*, in the *Annales du Muséum*. His descriptions of the two species are good, but misapplied; in proof of which, I need only quote the following observations which occur under the head *Sero-*

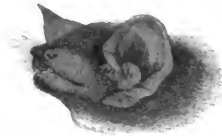
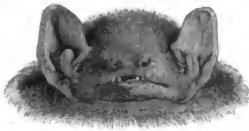
tine. Speaking of its distinctions from *Noctule*, he says, “ Il en diffère par l'oreillon, qu'il a plus court, arqué, et terminé par une large tête, ou une espèce de paume.” Nothing can be more correct than this discrimination, *mutato nomine*.

Dimensions :—

	Inch.	Lines.
Length of the head and body	2	11
„ of the head	0	10
„ of the tail	1	8
„ of the ears	0	7½
Breadth of the ears	0	6
Length of the tragus	0	2
„ of the fore-arm	2	0
Extent of the wings, 13 inches 8 lines to 14 inches and upwards.		

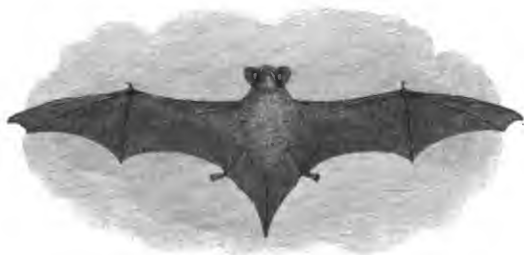
Dentition :—

$$I. \frac{3}{4} : C. \frac{2}{2} : F. M. \frac{3}{4} : M. \frac{3}{4} = \frac{10}{4}.$$



CHEIROPTERA.

VESPERTILIONIDÆ



HAIRY-ARMED BAT.

Vespertilio Leisleri.

Ears oval-triangular, shorter than the head; tragus barely one-third the length of the auricle, terminating in a rounded head: fur long, bright chestnut above, brownish grey beneath: under surface of the flying membrane with a broad band of hair along the fore-arm.

Vespertilio dasycarpus, LEISLER.

„ *Leisleri*, KÜHL, Deut. Flederm. p. 46, sp. 6. DESMAR. Mammal. p. 138. JENYNS, Brit. Vert. p. 23.

ALTHOUGH the name which I have retained for this species is not the one which was originally applied to it by its discoverer Leisler, I have preferred that by which Kuhl conveyed a well-merited compliment to that naturalist, who has contributed so much to our knowledge of European Bats. Were it not for this reason, it would have been desirable to restore the former term, which is founded upon a marked distinctive character, and the meaning of which I have still endeavoured to convey in the English name now chosen for it.

As an English species, our knowledge of it is but meagre ; it is limited to the existence of a single specimen in the British Museum ; of which, although I believe it is undoubtedly native, there exists no information as to the place where it was taken.

It was first discovered in Germany by Leisler, and is described by Kuhl ; but I am not aware that it has ever before been figured. The present representation was taken from the specimen in the British Museum.

It is said to frequent hollow trees, where it congregates in vast numbers, unaccompanied by any other species. It is fond of the neighbourhood of stagnant waters, doubtless for the purpose of feeding on the various insects which frequent such situations. Its flight resembles that of the Noctule, a species to which it appears to be nearly allied in many of its characters, especially in the form of the tragus and the formula of its dentition.

The head is short and flattened ; the muzzle rather elongated ; the nose depressed and naked ; the nostrils crescent-shaped ; a large sebaceous gland exists above the commissure of the lips. Ears hairy on the inner surface, oval-triangular, two-thirds the length of the head, very broad ; the outer margin not reaching to the corners of the mouth ; tragus half the length of the ear, terminating in a rounded head, which is slightly curved inwards, and produced on its outer margin. A band of short hair, about four lines in breadth, extends along the inferior surface of the fore-arm to the wrist, being thickest and most extended about the latter part. Fur long ; above deep brown at the base, bright chestnut at the surface ; beneath dusky at the base, dark greyish brown at the surface. Flying membrane dusky ; the part contiguous with the body very hairy both above and beneath. Thumb short and feeble.

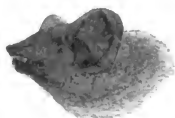
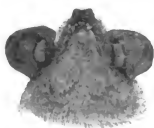
The colour is said to be much darker in young than in old specimens; a circumstance which is also observed in some other species, as *V. Daubentonii*, the Pipistrelle, &c.

Dimensions :—

	Inch.	Lines.
Length of the head and body	2	6
„ of the head	0	9
„ of the tail	1	8
„ of the ears	0	5
Breadth of the ears	0	4
Length of the tragus	0	1½
Extent of the wings	11	3

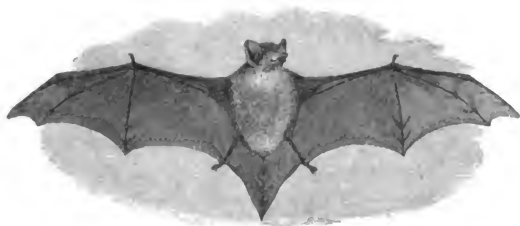
Dentition :—

I. $\frac{3}{2}$: C. $\frac{3}{2}$: F. M. $\frac{4}{4}$: M. $\frac{8}{8}$ = $\frac{11}{12}$.



CHEIROPTERA.

VESPERTILIONIDÆ.



PARTICOLOURED BAT.

Vespertilio discolor.

Ears about two-thirds the length of the head, oval, with a projecting lobe on the inner margin; tragus of nearly equal breadth throughout, rather more than one-third the length of the auricle: fur above reddish brown, with the tips of the hairs white; beneath dirty white.

Vespertilio discolor, NATTERER. KÜHL, Deut. Flederm. sp. 8, t. xxv. fig. 2.
DESMAR. Mammal. p. 139. JENYNS, Brit. Vert. p. 24.

THIS species, which belongs to the same division of the genus as the Noctule, agreeing with it in the formula of its dentition, as well as in the short and obtuse character of the tragus, was first discovered on the Continent by Dr. Natterer, who found it in Germany. It is not, however, common in that country, and has not been observed in the central and northern parts, in Holland, nor, I believe, in any other part of the Continent. A single specimen, now in the British Museum, was taken at Plymouth by Dr. Leach, which appears to be the only one that has yet been noticed in this country. It is said to frequent towns, and indeed has not been seen in any other situations; and it comes abroad early in the evening.

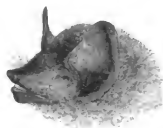
This is one of the most beautiful species of European Bats, from the richness of the prevailing colour of the fur, its marbled appearance arising from the lighter colour of the tips of the hairs, and the striking contrast between the upper and lower parts.

The forehead is broad and hairy; the muzzle broad, tumid, and very long; the nose thick and broad, and the lips tumid. The eyes are very small. The ears about two-thirds the length of the head, rounded, oval, turned outwards; the outer margin approaching the corners of the mouth, the inner margin with a distinct lobe at the base; the basal half of the ears hairy; tragus little more than one-third the length of the auricle, of equal breadth throughout, a little curved, opaque, and naked. Tail exerted for about three lines; bands of the interfemoral membrane, about nine or ten.

Fur of the upper part of a rich chestnut, the extreme points of the hairs being pale, giving a variegated or marbled appearance; that of the under parts grey at the base, white at the tips, excepting a large patch occupying the middle of the chest and belly, of a reddish brown colour mixed with white.

Dimensions :—

	Inch.	Lines.
Length of the head and body	2	8
„ of the head	0	10
„ of the tail	1	6
„ of the ears	0	6½
„ of the tragus	0	2½
Extent of the wings	10	6



CHEIROPTERA.

VESPERTILIONIDÆ.



COMMON BAT, FLITTER-MOUSE.

PIPISTRELLE.

Vespertilio pipistrellus.

Ears two-thirds the length of the head, oval-triangular, notched on the outer margin; tragus nearly half as long as the auricle, almost straight, thickened, obtuse, and rounded at the apex: fur reddish brown above, paler beneath.

- Vespertilio pipistrellus*, GEOFFROY, Ann. Mus. d'Hist. Nat. VIII. p. 195, t. xlvii. xlviii. KÜHL, Deutchl. Flederm. sp. 12.
 DESMAR. Mam. p. 139. JENYNS, Linn. Trans. XVI. p. 163. Id. Brit. Vert. p. 24.
La Pipistrelle, DAUBENTON, Mém. de l'Acad. des Sc. 1759, p. 381, t. i. f. 3. BUFFON, Hist. Nat. VIII. p. 129, t. xix.
Common Bat, PENNANT, Brit. Zool. p. 184.

WE owe to the Rev. L. Jenyns the elucidation of the synonymes of our Common Bat. In the 16th volume of the Linnæan Transactions, that gentleman has given an elaborate and satisfactory paper on this subject, in which it is investigated with great acumen and judgment; and the conclusion which he draws, and which appears to be completely esta-

blished, is, that the Common Bat of Britain is the Pipistrelle of the Continental authors.

The careless and implicit manner in which authorities are constantly followed without sufficient investigation, and error thus propagated from error, is as conspicuous in the present case as in most that could be adduced. Because *Vespertilio murinus* was the Common Bat of the Continental naturalists—their “Chauve-souris” *par excellence*—it was presumed that our Common Bat must be the same species; and Pennant having once stated such to be the case, every subsequent writer on our British Mammalia has copied the mistake; and *V. murinus*, one of the rarest of our indigenous species, was still to be the Common Bat of Britain. It was left to Mr. Jenyns to correct this long-established error; and it is sufficient to refer to his paper every one who wishes to be satisfied on the matter. I have carefully followed out the comparisons instituted by Mr. Jenyns, as far as my opportunities have enabled me, and can come to no other conclusion than that which he has established. The synonymes, therefore, of all our British Faunists, from Pennant down to Fleming inclusive, are erroneous as regards the present species.

From the commonness of this Bat, from the duration of the period of its activity, appearing earlier and retiring later than any other, and from its frequenting the neighbourhood of our dwellings, we have become better acquainted with its habits than with those of any other, if we except perhaps the Long-eared Bat, *Plecotus auritus*, which is indeed, in some places, as common as this. The Pipistrelle makes its appearance, after its short period of torpidity, as early as the middle of March, and does not wholly retire into a state of undisturbed hibernation until the winter has decidedly set in: its torpidity, therefore, can hardly be said to continue more than from two to three months. I have a specimen

which was shot by Mr. Gould, of the Zoological Society, in the middle of a bright, sunny, but frosty day, just before Christmas. Their final retirement does not depend exclusively upon temperature; for although before the severe frosts set in they continue to fly even when it is below the freezing point, they do not again appear until the time above mentioned, notwithstanding the thermometer, as Mr. Jenyns has observed, may have often risen considerably above 50° of Fahrenheit. This peculiarity is of easy solution. The fondness of the animal for different species of gnats has been observed even from the earliest period;* and from the diminutive size of the Pipistrelle, it is probable that these little insects constitute its principal food. These and many other dipterous insects, after having disappeared during the ungenial fogs and rains of the close of autumn, often make their appearance again in smaller numbers, on every fine, warm day, until the severe cold of the depth of winter finally destroys the greater part of them. The same impulse of hunger equally accounts for the appearance of the Pipistrelle in the daytime at this period of the year; as it is only at that time that the temperature is sufficiently elevated to summon into temporary activity its insect food.

The place of retirement generally chosen by this species is under the roofs of houses, and in the crevices of buildings of every description. Mr. Jenyns remarks, that each species appears to have its own peculiar place of concealment; and that while the Noctule resorts to hollow trees, and the Long-eared Bat to roofs of houses, the present species is found in "crevices of decayed brick-walls, in the cracks of old door-frames, or behind the leaden pipes frequently attached to buildings for carrying off the rain." That such are the usual

* "Et in cibatu culices gratissimi."—*Plin.*

situations for these respective species, Mr. Jenyns's statement would be a sufficient authority, even were it not amply confirmed by other observations: but that Bats are not so exclusive in their places of hibernation as may seem to be implied by the previous observation, is, I believe, equally true. I received last winter, from one chalk cavern at Chisselhurst, *Vespertilio Nattereri*, *V. mystacinus*, *Plecotus auritus*, and *Barbastellus*, all taken at one time: and it is clear that such retreats as are formed by art *cannot* be considered in the light of original and natural situations of retirement.

It is remarked by Geoffroy, that the Pipistrelle is not unfrequently found on the ground, worn out with ineffectual efforts to regain its flight, from its not finding an elevated spot from which to fall. This observation is totally incorrect as to the present, and probably every other species. I have often seen the Pipistrelle rise from a plain surface with a sort of spring, instantly expand its wings and take flight. This was repeated by a single individual, in my own library, several times in the course of an hour, and without the slightest appearance of difficulty or effort: it was, on the contrary, evidently a natural and usual action. I have observed the same habit in *V. Nattereri* and *Plecotus auritus*. In its progression on the ground, however, it differs considerably from some others, and particularly from the last-mentioned species. The *Plecotus*, in crawling or walking along a horizontal surface, has the anterior part of the body considerably elevated above the ground, and its progression is effected by a succession of abrupt impulses or leaps of one side after the other; whilst the Pipistrelle, which never raises the head from near the ground, runs along in an almost prostrate position, but at the same time with

more celerity and freedom than any other that I have had an opportunity of observing. In climbing it evinces a corresponding degree of agility.

But there is one circumstance of considerable interest which I have observed in this species, which, I believe, has not ever been noticed, and which, it is probable, appertains also to others. It is the prehensile character of the extremity of the tail. A small portion of the tail in this and in most other species of this family is exerted beyond the margin of the interfemoral membrane. Not only does the animal employ the tail in horizontal progression—in which case it assists in throwing forward the body, by being brought into contact with the ground on either side alternately, corresponding with the action of the hinder foot on the same side,—but in ascending and descending a rough perpendicular surface, this little caudal finger holds by any projecting point, and affords an evident support. This is particularly conspicuous when the Bat is traversing the wires of a cage, in which situation I first observed the fact.

The flight of the Pipistrelle is quick and flitting. It often frequents the neighbourhood of rivers, flying about the trees which grow on their banks, or over the surface of the water, in search of gnats and other small insects. In such situations I have seen them in autumn seeking their food in pairs. In the early spring, on the contrary, before they pair, they are gregarious; and flocks of females are found congregated together without a single male.

It has been generally said that Bats bring forth two young ones at a time. Pliny says, “*geminos infantes secum deportat.*” The observations of Mr. Daniel and others, however, both on the Noctule and the Pipistrelle, would show that this is not a general rule. Four females of the former

received in May 1834, and five of the latter in July 1833,—the only specimens sent to him, excepting one male Noctule,—had each of them a single fœtus.

This gentleman kept the Pipistrelles for some time, feeding them principally on flies, though they will also readily take small pieces of raw beef. “On the approach of a fly within the range of the Bat’s wings, it was struck down by their action, the animal itself falling at the same moment with all its membranes expanded, and cowering over the prostrate fly, with its head thrust under to secure its prey. When the head was again drawn forth, the membrane was closed, and the fly was observed to be almost invariably taken by the head.”

The fondness of the Common Bat for flesh, to which allusion has just been made, leads it not unfrequently to find its way into our larders, where it has been found clinging to a joint of meat, in the act of making a hearty meal from it. It is probable that other species commit similar depredations, as it is not difficult to keep most of them in confinement by feeding them exclusively on raw meat.

The Pipistrelle is the least of the British species, unless we except the Pygmy Bat of Dr. Leach. In its general aspect it considerably resembles the Noctule, excepting in the very great difference of size. The following description is so accurate and complete, that I have adopted it verbatim from Mr. Jenyns’s paper; and I have preferred it to a less extended one, as the identification of this species is, as has been stated, a matter of no small interest.

“Head much depressed in front, convex behind, with the upper part of the occiput remarkably protuberant; no occipital crest. Muzzle extending three lines beyond the ears; in young specimens rather elongated—which appearance wears off afterwards, from the enlargement of the head and the

filling up of the sides of the face, when the profile is somewhat altered. Nose obtuse at the extremity, and slightly emarginate between the nostrils; these last reniform, with tumid edges: on each side of the nose, immediately above the upper lip, is a protuberant swelling, formed by a congeries of sebaceous glands, which when cut through are of a yellowish white colour. Eyes round and very small, situate half-way between the above glands and the ears, and sunk deep in the head; over each, immediately above the anterior angle, is a small elevated wart furnished with a few black hairs; a transverse tuft of rather long upright hair on the forehead, which has the effect of making the head appear more elevated than it really is: rest of the face, including the cheeks, contour of the eyes, and space above the nose, almost naked, particularly in young specimens. Auricle broad, rather more than half [about two-thirds] as long as the head, oval approaching to triangular, deeply notched on its external margin about midway down: tragus [nearly] half the length of the auricle, oblong, and terminating in a rounded head, nearly straight, or slightly bending inwards. In the upper jaw four incisors—on each side two, of which the first is longest; in the lower jaw six, each of which has three lobes: grinders five on either side, above and below; the first in the upper, and the two first in the lower jaw, with only one point: of these last-mentioned teeth, the second is longer than the first; the other grinders in the lower jaw have each five points, three on the inner and two on the outer margin, which last are alternately long and short. Fur rather long and silky, yellowish red on the forehead and at the base of the ears; on the rest of the upper parts reddish brown, with the lower half of each hair dusky: on the under parts the hair is wholly dusky, except at the extreme tips, which are of the same colour as above, but paler. In

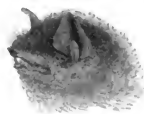
young specimens the fur is entirely of a dusky brown or brownish grey, in some instances almost black, without any tinge of red, which appears to come afterwards, and to increase in intensity with the age and size of the individual. Nose, lips, ears, flying and interfemoral membranes, dusky."

Dimensions :—

	Inch.	Lines.
Length of the head and body	1	7
„ of the head	0	6
„ of the tail	1	2
„ of the ear	0	4
„ of the tragus	0	2 nearly.
Breadth of the ear	0	3
Length of the fore-arm	1	2
Extent of the wings	8	4

Dentition :—

$$I. \frac{3}{4} : C. \frac{3}{4} : F. M. \frac{3}{4} : M. \frac{3}{4} = \frac{11}{4}.$$



CHEIROPTERA.

VESPERTILIONIDÆ.



PYGMY BAT.

Vespertilio pygmæus.

"Forehead with a longitudinal furrow; muzzle short and obtuse; ears a little shorter than the head, broad at the base, rounded at the extremity; tragus linear, half the length of the auricle: fur above red brown, darkest on the head and middle of the back, beneath paler."

Vespertilio pygmæus, LEACH, Zool. Journ. I. p. 560, t. xxii. JENYNS,
Brit. Vert. p. 25. DESMAR. in Dict. des Sc. Nat.

IN the Zoological Journal for 1825, there appeared a description of a new species of Bat, discovered by my friend Dr. Leach, whose short account of it is contained in a letter to one of the conductors of that work. He says, "I have named it *Vespertilio pygmæus*: it was taken at Spitchweek, near the forest of Dartmoor, where it is extremely common. The specimen is a female, and had milk in its mammæ. All that I have seen are nearly of the same size."

This specimen is now in the British Museum. It is the only one in existence in any collection, and has given rise to much doubt as to whether it be an adult and a new species, or some known species in a young state. This is a

question not perhaps very easy to decide. On the one hand, knowing well the accuracy of Dr. Leach's observation, and considering the fact of his having found milk in the mammæ, as well as the occurrence of numerous individuals, all of them about the same size, there would appear to be little hesitation in deciding it to be an adult specimen and a new species. But, on the other hand, a careful examination of the specimen itself in its present dry state shows that the epiphyses of the arm-bones are not yet ossified to the body of the bones, and that those of the cranium are also very deficient in ossification. The superior incisor teeth too have the distinct lobulated character of those of young Bats. Again, even supposing it to be a young one, it is not very easy to ascertain to what species it belongs. The form of the tragus, one of the most important characters, and the general construction of the ears, as far as can be ascertained in the dry state of the specimen, are certainly very like those parts in the *Pipistrelle*; but it has the bright reddish brown hue of the older individuals of that species, instead of the dark and almost black colour which belongs to the young. The number of bands on the interfemoral membrane is about the same as in the *Pipistrelle*; but they are thicker and more crowded. It is stated in the paper in which it was first described, that it differs from the *Pipistrelle* "in the form of the tragus, which is linear and simple,"—the very characters which distinguish that part in the *Pipistrelle*; and also "by the tip of the tail, which is exserted,"—another character of the last-named Bat, in common with many others. Upon the whole, I feel much disposed to leave the question in its present undecided state, until the capture of other specimens shall afford the opportunity of setting it at rest.

I give the following description from the paper in the *Zoological Journal*, the details of which I have confirmed by

an examination of the specimen; excepting that the dimensions are altered by drying. The figure is accurately taken from the specimen, and exhibits the peculiar circumstances above alluded to.

“ Head high in its vertical dimensions; rostrum short, obtuse, nearly of equal breadth throughout, very gradually attenuated to the nose, which terminates abruptly, and is short and broad; nostrils small, opening laterally; forehead marked by a longitudinal furrow: this is probably dependent on age. Ears shorter than the head, broad at the base, obtuse and rounded at the extremity; the anterior margin nearly straight, the posterior slightly concave and convolute; tragus about one-half of the length of the auricle, regularly linear, simple, and rounded at the extremity. Face covered rather scantily with a very short down, and without any lengthened bristly hairs. Tail as long as the body exclusive of the head, enveloped with the interfemoral membrane, excepting about one line of the tip, which is naked. Flying membrane of a dark brown colour; interfemoral membrane capable of great expansion by lateral cartilages, very gradually attenuated to a very short apex.

“ The head and body are covered with a very short delicate fur, of a dark brown colour on the upper parts, paler and inclining to grey underneath. The tint is deepest on the head, and on the highest part of the back, along the spine. The claws of the posterior extremities are comparatively broad.” Dimensions:—

	Inch.	Lines.
Length of the head and body	1	2½
„ of the head	0	5
„ of the ears	0	4
„ of the tail	0	9
Extent of the wings	5	4

Formula of dentition unknown; but probably the same as in the Noctule and Pipistrelle.

CHEIROPTERA.

VESPERTILIONIDÆ.



THE SEROTINE.

Vespertilio serotinus.

Ears oval-triangular, shorter than the head; tragus semicordate, little more than one-third the length of the auricle; fur chestnut brown above, yellowish grey beneath.

Vespertilio serotinus, GMÆL. DESMAR. Mammal. p. 137. KÜHL. Deutsch. Flederm. sp. 9. GRAY, Zool. Journ. II. p. 109. JENYNS, Brit. Vert. p. 22.

„ *noctula*, GEOFF. Ann. Mus. VIII. p. 193, t. xlvii. xlviii.

La Serotine, DAUBENT. Mém. Acad. 1759, p. 380, t. ii. f. 1. BUFFON, Hist. Nat. VIII. pp. 119, 129, t. xviii. f. 2.

THE SEROTINE, notwithstanding the clear and intelligible description of Daubenton, was mistaken for the *Noctule* by Geoffroy, who described the one for the other. It was discovered by Daubenton, and forms one of the subjects of his excellent paper on the Bats in the Memoirs of the

French Academy for 1759. It was also described and well figured in the eighth volume of Buffon's great work.

It appears to have very much the habit of the Noctule, at least as far as regards its late appearance in the spring, its sound and long-continued slumber. It flies from evening till morning, when the state of the atmosphere is favourable. In France, where it is far from being rare, it frequents forests, where it flies amongst lofty trees; it is also commonly found amongst the huge piles of wood in the timber-yards of Paris, seeking its place of repose on the tops of the highest piles. With us it appears to be a rare species, not having hitherto been found anywhere but around London. Its flight is slow. It shuns society more than most other Bats, being generally found either solitary or in pairs. It has only one young one at a birth, about the end of May in France, probably somewhat later in this country. It is found in Germany, Holland, France, and Switzerland.

The face is almost naked; the muzzle short, broad, and tumid; the nose is about a line and a half across; the nostrils rounded; the upper lip is furnished with sebaceous glands, from which spring a few hairs; the forehead is very hairy: the ears are oval, somewhat triangular, shorter than the head, the inner margin much arched; the apex obtuse, rounded, and bending outwards; the basal half hairy on the outer surface, the rest naked; the tragus elongate, semi-cordate, pointed at the extremity. The teeth are fewer in number than in any other British species of this family, there being only thirty-two, as in *Rhinolophus*. The tail is exerted to the extent of three lines.

The general colour of the fur in the male is a deep rich chestnut brown on the upper parts, passing into yellowish grey beneath; that of the female much brighter. The hair

is long, glossy, soft, and silky. The membranes are dark brown approaching to black.

In young individuals the head is said to be more round and thick in proportion, the muzzle shorter and more obtuse, the lip very tumid, and the colours more obscure, than in the adult.

Dimensions :—

	Inch.	Lines.
Length of the head and body	2	8
„ of the head	0	11
„ of the tail	1	10
„ of the ears	0	8
„ of the tragus	0	3
Extent of the wings	12	4

Dentition :—

$$I. \frac{3}{4} : C. \frac{2}{2} : F. M. \frac{4}{4} : M. \frac{6}{6} = \frac{11}{11}.$$



CHEIROPTERA.

VESPERTILIONIDÆ.



MOUSE-COLOURED BAT.

Vespertilio murinus.

Ears oval, broad at the base, becoming narrower towards the apex, as long as the head; tragus falciform, the inner margin straight, not quite half the length of the auricle: fur reddish brown above, dirty white beneath.

- Vespertilio major*, BRISSON, p. 214, No. 5. LINN. Syst. Nat.
 „ *murinus*, LINN. Syst. Nat. GEOFF. Ann. Mus. VIII. p. 191,
 t. xlvii. xlviii. DESMAR. Mammal. p. 134. JENYNS,
 Brit. Vert. p. 20.
 „ *myotis*, KÜHL. Deut. Flederm. p. 36, sp. 4.
La Chauve-souris, DAUBENT. Mém. de l'Acad. des Sc. 1759, p. 378, t. i.
 BUFFON, Hist. Nat. VIII. p. 113, t. xx.

IN the account of the Pipistrelle, the reasons have been detailed for abolishing the name of *Vespertilio murinus* as that of the Common Bat of Great Britain. On the Continent, indeed, this species is very generally met with. It

was probably the species known to the Greeks by the name of *Νυκτερίς*, and may be considered as one of the most frequent in Germany, as well as in France and in many other parts of Europe: but in England it is one of the rarest species yet discovered to be indigenous to the country, and has, I believe, hitherto only been taken in the gardens of the British Museum. It is one of the largest of the European, and certainly the largest of the British Bats, exceeding even the Noctule in the length of the body by about half an inch, and in the extent of the wings by full an inch. In those countries where it exists in the greatest profusion, it is found by hundreds together, in ancient buildings, in the towers of churches, and other similar retreats; but it does not resort to forests or woods, as many other species do. It is not found associated with others; and even amongst themselves, they frequently have violent and bloody quarrels, fighting with their sharp teeth, and holding on to each other by their hooked thumbs, sometimes tearing each other, and even breaking the slender wing-bones of their antagonists.

They feed on various kinds of nocturnal and crepuscular insects, particularly the nocturnal Lepidoptera; the harder parts of which, with portions of the wings, are found unchanged in their excrements. Buffon relates, probably of this species, that having descended into the grottoes at Arcy for the purpose of examining the stalactites, he was astonished to perceive the ground covered, to an extent of many feet in breadth, with a thick layer of soil, formed principally of the remains of the wings and hard parts of various insects, as if they had congregated there in countless multitudes to perish and rot together. It proved, however, to consist of the excrement of Bats which had suspended themselves from the roof of the grotto: the mass had probably been accumulating for very many years.

The head of this Bat is long ; the face sparsely covered only with scattered, stiffish, long hairs ; the forehead very hairy ; the nose naked and smooth, prominent, extending beyond the lower lip ; the gape wide ; the nostrils opening laterally, the margins tumid. Eyes rather large, with a few long black hairs immediately above them. Ears inclining backwards, standing strongly out from the head, oval, broad at the base, becoming narrower and even a little pointed at the apex, as long as the head, with a few scattered hairs near the base on the inner margin ; tragus falciform, directed a little inwards, the inner margin quite straight.

Colour of the fur, above reddish brown, beneath greyish white, the hairs being all blackish at the base. Ears grey without, tending to yellowish within. Membranes yellowish brown, paler than in most other species.

Dimensions :—

	Inch.	Lines.
Length of the head and body	3	7
„ of the head	0	9
„ of the tail	1	7½
„ of the ears	0	11½
Breadth of the ears	0	5
Length of the tragus	0	5½
Extent of the wings	15	0

Dentition :—

$$I. \frac{3}{4} : C. \frac{3}{4} : F. M. \frac{3}{4} : M. \frac{3}{4} = \frac{12}{10}.$$



CHEIROPTERA.

VESPERTILIONIDÆ.



BECHSTEIN'S BAT.

Vespertilio Bechsteinii.

Ears oval, rather longer than the head; tragus narrow, falciform, not half the length of the auricle: fur reddish grey above, greyish white beneath.

Vespertilio Bechsteinii, LEISLER. KÜHL, Duet. Flederm. p. 30, sp. 2, t. xxii.
 DESMAR. Mammal. p. 135. JENYNS, Brit. Vert. p. 21.

THIS handsome and striking species is rare in this country, being only known as British from the occurrence of specimens taken by Mr. Millard in the New Forest, and now in the British Museum. This locality corresponds with its habits as detailed by the Continental naturalists, who state that it resorts exclusively to the hollow trees in the midst of forests, never approaching towns or retiring to buildings. It shuns even all association with other species of Bats, congregating in small groups of about a dozen, the largest number observed together being thirteen, all of which were females.

The general resemblance of this species to *V. murinus* and to *V. Nattereri*, with both of which it agrees in the essential

points of the form of the tragus and the formula of the dentition, is very obvious on the most superficial observation. It is however readily distinguished from the former species by the larger size of the ears, the different proportions of the wings—which although equally broad, have not nearly the same relative length,—by the darker colour of the membrane, and the lighter colour of the belly. From *V. Nattereri* it differs in the entire and simple margin of the interfemoral membrane, in its larger size, and the greater length of its ears.

The face is rather hairy, with a few stiffer hairs intermixed; the muzzle long and conical; the gape wide, extending to the base of the ears; the nose rather narrow, and slightly depressed in the middle. Ears obviously longer than the head, rounded, and bending outwards at the apex, oval, thin, and transparent; tragus somewhat falciform, bending a little outwards towards the extremity. Fur reddish grey above, brown at the base, light grey beneath, blackish at the base. Dimensions :—

	Inch.	Lines.
Length of the head and body	2	2
„ of the head	0	9
„ of the tail	1	5
„ of the ears	0	10
Breadth of the ears	0	5
Length of the tragus	0	4
Extent of the wings	11	0

Dentition :—

$$I. \frac{4}{3} : C. \frac{2}{3} : F. M. \frac{4}{3} : M. \frac{4}{3} = \frac{1}{2} \frac{4}{3}.$$



CHEIROPTERA.

VESPERTILIONIDÆ.



THE REDDISH-GREY BAT.

Vespertilio Nattereri.

Specific Character.—Ears oblong-oval, about as long as the head ; tragus narrow-lanceolate, nearly two-thirds the length of the ear : interfemoral membrane with the margin crenate and stiffly ciliated, from the end of the spur to the tail : fur rufous grey above, whitish beneath.

Vespertilio Nattereri, Kuhl, *Deutschl. Flederm.* p. 33, sp. 3, t. xxiii. *Desmar. Mam.* p. 138. *Jenyns, Brit. Vert.* p. 23.

THIS species, to which I have applied the English name of Reddish-grey Bat from its prevailing colour, was first described by Kuhl, and named by him after my friend Dr. Natterer, the celebrated Austrian naturalist. In this country it appears to be of not unfrequent occurrence, though certainly local in its distribution. Those in the British Museum were taken near London ; Mr. Jenyns gives Swaffham in Cambridgeshire as a habitat ; I have seen specimens belonging to Mr. Yarrell from Colchester and from Norwich ; and I received three living ones, by the kindness of my friend

Dr. Waring, from Chiselhurst in Kent, where they were taken during their hibernation, in company with *Barbastellus*, *Vespertilio mystacinus*, and *Plecotus auritus*. They were found in a large chalk cavern, at the bottom of a shaft seventy feet in depth. These specimens continued alive for a short time, feeding on bits of raw meat, and exhibiting great familiarity not only towards their companions, but with myself, eating from my hand, and allowing me to meddle with them without evincing fear or anger. One of them was one morning found dead, and partially eaten by his companions; and the remaining two died shortly afterwards. They were active in their habits, running about the cage and climbing with great agility; their attitude when running on a plane surface was more horizontal than that of the Long-eared Bat, though perhaps less so than the Pipistrelle, which runs along almost on its belly.

The head of this Bat is smaller in proportion than that of most others; the muzzle narrowed, projecting beyond the lower jaw, and naked at the extremity; the face is hairy, some of the hairs very long, scattered and projecting in a sort of thin moustache over the lip; there is a prominent sebaceous gland on each side of the face above the lip. Nostrils oval, with tumid margins, placed immediately above the margin of the lip. Ears oblong-oval, as long as the head, rather more than half as broad as they are long; the extreme inner margin reflexed; the outer margin scarcely notched, extending downwards and forwards to meet the inner margin at the base; tragus two-thirds as long as the auricle, very narrow, lanceolate, thin, and naked. Eyes very small. Flying membrane semi-transparent, naked; interfemoral portion with only eight transverse lines; the spur very long, and the margin of the membrane from the spur to the tip of the tail crenate, and furnished with a lash of stiff short hairs. Exserted portion of the tail very short.

The colour of this Bat is lighter than that of most others. The fur above, which is long and soft, is light reddish brown, with a grey glance, from the tips of the hairs being greyish, and the roots of the former colour. Beneath it is light silvery grey, the tips of the hair being white, and the roots nearly black. The ears and muzzle pale. The membrane smoky grey with a slight rufous tinge.

Dimensions :—

	Inch.	Lines.
Length of the head and body	1	11
„ of the head	0	8
„ of the tail	1	8
„ of the ears	0	8
Breadth of the ears	0	3½
Length of the tragus	0	5
Extent of the wings	11	0

Dentition :—

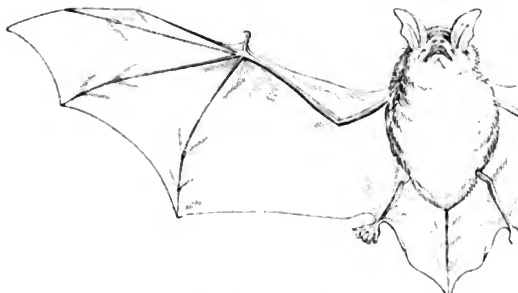
$$I. \frac{3}{8} : C. \frac{2}{2} : F. M. \frac{3}{8} : M. \frac{6}{8} = \frac{15}{20}.$$

Desmarest has given an erroneous statement of the number of teeth in this Bat : he says there are but five molares on each side above. This mistake arose from the extreme minuteness of the two smaller false molares, which were doubtless taken for a single one. The dentition, in fact, corresponds exactly with that of *V. murinus*, *Bechsteinii*, and *emarginatus*.



CHEIROPTERA.

VESPERTILIONIDÆ.



NOTCH-EARED BAT.

Vespertilio emarginatus.

Ears oblong, as long as the head, with a notch and a small lobe on the outer margin; tragus awl-shaped, a little curved outwards, more than half the length of the auricle: fur reddish grey above, ash-coloured beneath.

Vespertilio emarginatus, GEOFFR. Ann. du Mus. d'Hist. Nat. VIII. p. 198, t. xlv. xlviii. DESMAR. Mam. p. 140. (Not *V. emarginatus* of Jenyns.)

OUR information respecting this species is confined to the brief and unsatisfactory notice—for it scarcely deserves the name of a description—given in the *Annales du Muséum* by Geoffroy, who first established it, and copied by Desmarest in his *Mammalogie*. It was first found at Abbeville by M. Baillon, and by Geoffroy in the subterranean excavations at Charlemont. The only notice we have of its occurrence as a British species, is a statement by its first describer, the distinguished naturalist just named, that he received an individual from M. Alexander Brongniart, who took it at some

distance from Dover. Upon this sole ground M. Geoffroy says that it is "assez commune en Angleterre." The *Vespertilio emarginatus* of Mr. Jenyns's British Vertebrata is undoubtedly *V. Daubentonii* of Leisler and Kuhl. The following brief description is all that can be gathered from that of Geoffroy, assisted by his figure; and after all it is far from improbable that this is identical with the following species. The dentition is given from M. Frederic Cuvier, who has paid the greatest attention to the arrangement of the teeth in the *Cheiroptera*.

The head is rather broad, and the forehead elevated; the nose slightly notched between the nostrils. Ears oblong-oval, as long as the head, bending outward, with a small fold on the inner margin, and a deep notch with a small lobe beneath it on the outer margin; tragus subulate, bending outwards, rather more than half as long as the auricle. Tail not longer than the body. Colour of the fur, above, reddish grey on the surface, blackish at the base; beneath, ash-coloured. The present figures are copied from the outlines of Geoffroy.

Dimensions, from Desmarest :—

	Inch.	Lines.
Length of the head and body	2	0
„ of the tail	1	3
Extent of the wings	9	0

Dentition :—

$$I. \frac{3}{8} : C. \frac{2}{8} : F. M. \frac{8}{8} : M. \frac{8}{8} = \frac{18}{8}.$$



CHEIROPTERA.

VESPERTILIONIDÆ.



DAUBENTON'S BAT.

Vespertilio Daubentonii.

Ears oval, three-fourths the length of the head, very slightly notched on the outer margin, with a fold on the inner margin at the base; tragus narrow-lanceolate, rather obtuse, bending a little inwards, half the length of the auricle: tail longer than the body.

Vespertilio Daubentonii, LEISLER. KÜHL, Deut. Flederm. sp. 11, t. xxv. f. 2.

DESMAR. Mammal. p. 141.

„ *emarginatus*, JENYNS, Brit. Vert. p. 26.

A CAREFUL examination of several specimens of the species described by Mr. Jenyns, in his most useful Manual, under the name of *Vespertilio emarginatus*, has convinced me that the Bat so designated by him is the true *V. Daubentonii* of Kuhl and Desmarest, and not the *V. emarginatus* of Geoffroy; unless, indeed, as I have before suggested, they may prove to be identical. Mr. Jenyns has most obligingly lent me his specimen, which is an adult male, and was taken at Milton Park in Northamptonshire: my friend Mr. Yar-

rell has also kindly allowed me the use of his specimens, consisting of an adult female, a half-grown male, and an extremely young one, all of which were taken at Islington. It is upon an examination of these that I am enabled to state confidently their identity with the species to which I have referred them. The expression "oreilles petites," in Desmarest's essential character of *V. Daubentonii*, is so vague as to be useless, and at the same time conveys an idea which is absolutely erroneous; and were it not corrected by the statement of the actual length of the ears,—namely, half an inch,—it would greatly mislead any one who depended upon it. Such uncertain and arbitrary expressions in essential specific characters cannot be too strongly deprecated. In a group of animals such as the Bats, in which the distinctive characters are not very obvious, and are frequently dependant upon the comparative dimensions of small or inconspicuous parts, it is of the greatest consequence that the relative proportions be accurately stated; and if this be done, they form the most certain and valuable marks of distinction.

In its habits, as well as in many of its characters, this Bat resembles *V. mystacinus*. It flies rapidly, and near the ground, or over stagnant waters. It has been found in various parts of Germany; it is common at Hanau in Weteravia, and was taken by Dr. Natterer in Vienna: I am also informed by Dr. Beck that it is found in Denmark. I am not aware that it has been discovered in any other localities in this country than those abovementioned; unless the individual taken by M. Alexander Brongniart, and referred to *V. emarginatus*, may have been of this species.

The head is rather small; the forehead somewhat elevated, and the top of the head flattened; the muzzle obtuse, with numerous long and stiffish hairs, and a moustache of soft long hair on each side of the upper lip, which is also tumid

from a congeries of sebaceous glands on each side. Ears of moderate size, about three-fourths the length of the head, oval, bending a little outwards; the external margin very slightly notched, the inner margin with a fold near the base. Tragus somewhat lanceolate, narrow, rather obtuse at the apex, turned a little inwards, half as long as the ear. Tail a little longer than the fore-arm, exerted at the extremity for about a line. Hinder extremities robust; the feet strong, and the outer toe very distinct from the rest. Interfemoral membrane ample; the transverse lines, as in *V. mystacinus*, very numerous. Fur soft, plentiful, brownish black at the base; the surface greyish red above, ash grey beneath: the female and the younger individuals rather darker. Membranes dusky, with a reddish tinge; the interfemoral whitish beneath. Dimensions:—

	Inch.	Lines.
Length of the head and body	2	0
„ of the head	0	7
„ of the tail	1	6
„ of the ear	0	6
Breadth of the ear	0	3½
Length of the tragus	0	2½
„ of the fore-arm	1	4
Extent of the wings	9	0

Dentition:—

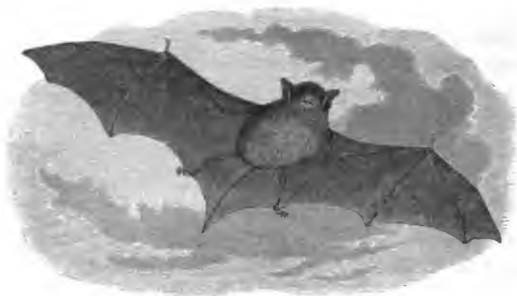
$$I. \frac{2}{3} : C. \frac{2}{3} : F. M. \frac{2}{3} : M. \frac{2}{3} = \frac{1}{2} \frac{2}{3}.$$



E

CHEIROPTERA.

VESPERTILIONIDÆ.



WHISKERED BAT.

Vespertilio mystacinus.

Ears oblong, bending outwards, shorter than the head, notched on the outer margin ; tragus half the length of the auricle, lanceolate, a little expanded at the outer margin near the base ; upper lip furnished with a moustache of long fine hair : fur blackish chestnut above, dusky beneath.

Vespertilio mystacinus, LEISLER. KUHLE, Deutsch. Flederm. sp. 14. DESMAR.
Mammal. p. 140. GRAY, Zool. Journ. II. p. 109.
JENYNS, Brit. Vert. p. 26.

THIS species was discovered by Leisler in Germany, where it is said to be rare. The first notice of its being an inhabitant of this country is, I believe, in Mr. Gray's enumeration of British *Vespertilionidæ* in the Zoological Journal. This gentleman supposes that Montagu mistook it for *Barbastellus*, and states that the specimen marked *Barbastellus* in the British Museum, which belonged to Montagu, is of this species. Mr. Jenyns has obtained it in Cambridgeshire and Northamptonshire ; Mr. Yarrell, from the caverns at

Colchester; and I had one living which was sent me from the chalk cavern at Chiselhurst in Kent. I believe that the species has not hitherto been figured; the present figure is taken from the one which I had living.

Of its habits little observation has hitherto been made. It is said to fly low and rapidly; to continue but a short period in a state of hibernation, and to retire to houses and trees indifferently. To this I can only add, that it is also found in the winter in caverns, as proved by Mr. Yarrell's specimen and my own. I observed it to be a timid and restless species; and during the short time my specimen lived, it refused food, though all its companions, of various species, were feeding freely.

The head is rather long, the forehead flattish, the occiput prominent; the muzzle is obtuse, slightly emarginate between the nostrils, which are tumid, particularly at the upper and inner angle. Face very hairy; the hairs on the lip longer than the others, forming a moustache; and there is a similar row across the forehead: the chin has also a few long and stiffish hairs. Ears shorter than the head, oblong, rounded at the upper part, bending outwards, broad at the base, rather deeply excavated at the outer margin; tragus rather more than half the length of the ears, lanceolate, strait, a little expanded on the outer margin near the base. Eyes small, and much concealed by the hairs. Tail longer than the fore-arm, the exerted portion about a line in length, curved. Fur long and thick; the hairs of the upper part of a dusky black colour, excepting at the extreme tips, which are rufous; beneath ash grey at the tips, blackish near the roots. Ears and flying membrane dusky, very dark; the transverse lines of the wings very numerous, those of the interfemoral membrane being no fewer than eighteen.

Dimensions :—

	Inch.	Lines.
Length of the head and body	1	8
„ of the head	0	7
„ of the tail	1	5
„ of the ears	0	5½
Breadth of the ears	0	3½
Length of the tragus	0	3 nearly
„ of the fore-arm	1	3
Extent of the wings	8	6

Dentition :—

$$I. \frac{4}{8} : C. \frac{2}{8} : F. M. \frac{8}{8} : M. \frac{8}{8} = \frac{18}{20}.$$



CHEIROPTERA.

VESPERTILIONIDÆ.

Genus, *Plecotus*. (Geoff.)

Generic Character.—Ears very large, much longer than the head, united at the base. Cutting teeth $\frac{3}{4}$, grinders $\frac{4}{5}$.

LONG-EARED BAT.

Plecotus auritus.

Ears more than twice the length of the head ; tail longer than the fore-arm, rather obtuse at the apex : fur brownish grey above, paler beneath.

Vespertilio minor, BRISSON, Quad. 226.

„ *auritus*, LINN. Syst. Nat. 47, sp. 5. GEOFF. Ann. Mus. VIII.
p. 197. KÜHL, Deutsch. Flederm. sp. 1. DESMAR.
Mammal. p. 114. JENYNS, Brit. Vert. p. 27, sp. 36.

Plecotus auritus, GEOFF. GRAY, Zool. Journ. II. p. 109. FLEM. Brit. An.
p. 7.

L'Oreillard, DAUBENT. Mém. Acad. 1759, p. 376, t. i. f. 2. BUFFON,
Hist. Nat. VIII. p. 118, t. xvii. f. 1.

Long-eared Bat, PENN. Brit. Quad. I. p. 147, t. xiii.

THE comparative ignorance of the characters of the *Cheiroptera* which prevailed until Daubenton set the example of a more attentive observation of them, can scarcely have a

more striking illustration than the fact that the present species, although larger than many other European species, now well known and sufficiently distinguished, received from Brisson, who first characterized it, the name of *Vespertilio minor*, the comparative term *major* having been at first applied to *V. murinus*; and Linnæus, who altered the above specific names in the twelfth edition of his *Systema Naturæ*, has the following remarkable observation appended to the present species, *V. murinus* being the one following it. “Distincta species auriculis, nisi solo sexu cum sequenti conveniat.”

It is one of the most common of our British Bats; and the extraordinary developement of the ears, their beautiful transparency, and the elegant curves into which they are thrown at the will of the animal, render it by far the most pleasing: it is also more readily tamed than any other, and may soon be brought to exhibit a considerable degree of familiarity with those who feed and caress it. I have frequently watched them when in confinement, and have observed them to be bold and familiar even from the first. They are very cleanly; not only cleaning themselves after feeding, and at other times, with great assiduity, but occasionally assisting each other in this office. They are very playful too, and their gambols are not the less amusing from their awkwardness. They run over and against each other, pretending to bite, but never harming their companions of the same species; though I have seen them exhibit a sad spirit of persecution to an unfortunate *Barbastelle* which was placed in the same cage with them. They may be readily brought to eat from the hand; and my friend Mr. James Sowerby had one during last summer which, when at liberty in the parlour, would fly to the hand of any of the young people who held up a fly towards it, and pitching on the

hand, take the fly without hesitation. If the insect were held between the lips, the Bat would then settle on its young patron's cheek, and take the fly with great gentleness from the mouth: and so far was this familiarity carried, that when either of my young friends made a humming noise with the mouth in imitation of an insect, the Bat would search about the lips for the promised dainty.

The progression of this species on the ground differs considerably from that of all the species of true *Vespertilio* that I have seen. Instead of running quickly along the ground in a horizontal posture with the head low, the fore parts are somewhat raised and the body thrown forward by successive jerkings, given alternately on one side and the other.

The large and beautiful ears are usually folded under the arm during sleep, especially if the sleep be profound: and this is also the case during hibernation; the long tragus then hangs down, and gives the animal the appearance of having short and slender ears.* Indeed, a person who had not seen it in the act of folding its ears, could never imagine it to be the same species when they are fully expanded. This circumstance refutes the notion suggested by Edwards and adopted by Pennant, that the "lesser ear may possibly serve as a valve to close the larger in the sleeping state of this animal."

The cry of this species is acute and shrill, but not loud. It affords a rather remarkable illustration of the well-known fact, that some persons are incapable of detecting certain sounds; as during the time that I kept several of them living, although their small sharp cry was distinctly audible to persons sitting much farther from them than myself, and though I bent my attention closely to them, listening with

* See the figure at page 11.

the greatest intentness, I could not detect the sound unless I placed my ear close to their cage, though it was uttered frequently. On being disturbed, the sound becomes more clear and piercing.

It frequents towns and villages, and retreats during its hibernation under the roofs of houses, and to the towers of churches.

The head is flattened; the muzzle rather long and projecting, horizontal, and slightly emarginate; nostrils with prominent edges, the openings lateral, passing backwards and outwards into a small fossa. The ears are enormously large, oval-oblong, semi-transparent, and transversely plicated; the outer margin commences immediately behind the angle of the mouth, and the inner third of its breadth is supported by three extremely thin slender cartilages, the elasticity of which must tend to restore the ear to its erect position after being turned under the arm during sleep: these cartilages extend nearly the whole length of the ear, and the inner margin is bent back from the middle cartilage, forming a broad longitudinal fold, which is ciliated at its edge, as well as along the carina formed by its duplicature. About a line from its base is a small lobe projecting laterally, so that when the ears are erect the two lobes touch each other: this lobe is hairy, thicker and more opaque than the rest of the ear. Immediately beneath it the ears are united over the forehead, forming an angular notch at the point of their junction. Tragus elongate, lanceolate, rather obtuse, bending very slightly outwards, about two-fifths the length of the ear. Eyes lateral, conspicuous, placed about a line anterior to the inner angle of the base of the tragus. The body appears rather broad, from the fur extending much over the shoulders. Tail nearly as long as the head and body, and longer than the fore-arm; projecting about a line beyond the mar-

gin of the interfemoral membrane. Spur extending fully half-way from the tarsus to the tail. Fur rather long, thick, soft, and silky; above, lightish brown with a reddish tinge, which is more conspicuous in young specimens, the older ones being more grey; beneath, pale brownish grey; the hairs are all blackish at the base. Membranes dusky, with a rufous tinge. Transverse lines on the interfemoral about twelve.

Dimensions :—

	Inch.	Lines.
Length of the head and body	1	10
„ of the head	0	8
„ of the tail	1	8
„ of the ear	1	5
Breadth of the ear	0	9
Length of the tragus	0	7
„ of the fore-arm	1	5
Extent of the wings	10	0

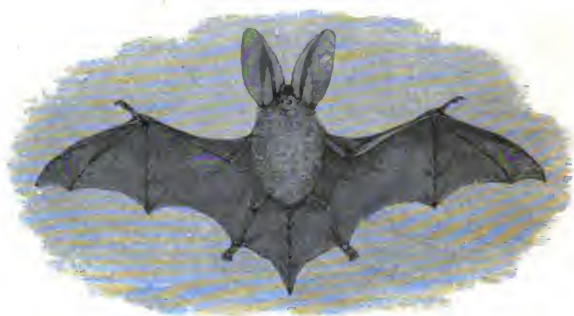
Dentition :—

$$I. \frac{1}{2} : C. \frac{2}{2} : F. M. \frac{1}{2} . M. \frac{2}{2} = \frac{1}{2} \frac{2}{2}.$$



CHEIROPTERA.

VESPERTILIONIDÆ.



LESSER LONG-EARED BAT.

Plecotus brevimanus.

Ears not double the length of the head ; tail equal in length to the forearm, acute at the apex : fur reddish brown on the upper parts, yellowish white beneath.

Vespertilio brevimanus, JENYNS, Trans. Linn. Soc. XVI. p. 55, t. i. f. 2.
Id. Brit. Vert. p. 28.

THE only specimen of this Bat which has hitherto been taken was found by Mr. Jenyns "adhering to the bark of an old pollard willow in Grunty Fen, in the Isle of Ely;" and it was first described by that gentleman in the sixteenth volume of the Transactions of the Linnean Society. Mr. Jenyns has most kindly lent me the specimen, and I have had the accompanying figure taken immediately from it, which I have preferred to a mere copy of that given in the original paper, to which I also beg to refer. I have thought it desirable thus to multiply the means of ascertaining the

characters of this Bat, that the reader may be enabled to form his own judgment as to its being a distinct species, or merely a variety of *P. auritus*. A very careful comparison of their characters has inclined me to the opinion that they are distinct; and although, until more specimens are taken, it would be scarcely safe to form a very decided judgment on the question, the remarkable differences of colour, combined with the proportional variations of numerous parts of the animal, offer no inconsiderable grounds in its support.

It is worthy of remark, that two Bats are mentioned by Desmarest as varieties of *P. auritus*, one of which, an inhabitant of Egypt, is described as smaller than the common one, as having a redder fur, and the last vertebra of the tail more detached from the interfemoral membrane; all of which characters belong also to *P. brevimanus*: and my friend Dr. Beck of Copenhagen informs me that there are two species of *Plecotus* found in Denmark; one of which, however, is probably that described by Faber in the Isis for 1826, under the name of *P. cornutus*. It was observed some years before by M. Faber in Jutland, and is described as having the ears as long as the body (one inch seven lines), the tragus more than half the length of the ears, and the fur on the upper part of a brown colour, black at the base, and the under parts bluish black, mingled with grey on the belly and throat.

Mr. Jenyns has well observed, that the Long-eared Bat has had very different dimensions assigned to it by different authors; a fact which renders still more probable the existence of more than one allied species. "Thus we find Donovan asserts the *Long-eared Bat* to be 'one of the largest species of the genus that inhabits England;' whilst Shaw observes, that it is smaller than the *Short-eared*, or common sort." Several writers have also stated the extent of the wings

to be seven inches, whilst that of the true *P. auritus* is not less than ten inches.

Mr. Jenyns further observes, that this Bat must be rare in Cambridgeshire, from the circumstance of no other specimen having been found; and suggests that its natural place of abode is in the open country, remote from the habitations of men; and that during its hours of repose it retires to hollow trees,—exhibiting thus a remarkable difference from the ordinary species, which resorts to buildings, and particularly to the interior of the roofs of dwelling-houses.

I proceed now to give the detailed description of this little Bat, which I prefer taking verbatim from Mr. Jenyns's paper.

“ It will be observed, in the first place, that in *Plecotus auritus* the auricle is much larger in proportion to the body, and longer in proportion to the tragus, than in *P. brevimanus*; and again, that in the former species the tail exceeds the fore-arm in length by three lines, whilst in the latter these parts are equal. There is nearly as great a difference with respect to the relative proportions of the femur and tibia, which are likewise of equal length in *P. brevimanus*. On the other hand, in the *P. auritus* the thumb is somewhat shorter, and the tail not so much exerted from the interfemoral membrane; of which last part it may also be added, that in the *P. brevimanus* its extreme tip terminates in a fine point, whilst in the *P. auritus* it is somewhat obtuse and flattened. Another, and perhaps the most obvious distinction, resides in the expansion of the flying membrane, which, viewed *relatively* as well as *absolutely*, is by much the more considerable. This circumstance arises from the greater development of the metacarpal bones and the phalanges of the fingers, as compared with the arm and fore-arm. In the *P. auritus*, the length of the middle finger, or the distance measured from the carpus to the apex of the wing, exceeds

in length the arm and fore-arm together by three lines, and the fore-arm taken separately by more than an inch ; whereas in the *P. brevimanus* the length of this part is *less* than that of the arm and fore-arm together, and only exceeds the fore-arm separately by six lines. It is with a view to this last peculiarity that I have selected the trivial name of this species. Lastly, I may remark, that in the *P. brevimanus* there is a shallow notch on each side of the interfemoral membrane, about half-way between the heel and the extremity of the tail, which in the *P. auritus* is scarcely visible.

“ The above distinctions, many of which are founded upon a comparative view of the osteology of the two species, can scarcely be considered as the variations of a different age. Independently of them, however, these Bats, when seen together, will not be easily confounded, from the great difference in their *absolute* size, and in the colour, more especially of their under parts. In the *P. auritus*, the colour is brownish grey mixed with dusky, and is nearly the same above and below, being in the last instance merely of a somewhat paler tint. In the *P. brevimanus*, not only have the upper parts a reddish tinge, which in a slight degree pervades the ears, wings, and interfemoral membrane ; but, what is more striking, they present a marked contrast with those underneath, which approach to a yellowish white. Moreover, it is worthy of note, that in this last species the hair is everywhere of the same colour throughout its whole length ; whereas in the former it is of *two* colours, being always blackish at the roots.” *

I make no apology for the length of this quotation, which appeared to me to be equally required for the purpose of showing the grounds upon which the respected author had established the species, and of enabling any other naturalists who may have the good fortune to obtain specimens of it

* Linn. Trans. XVI. p. 56.

at once to determine it, and to decide the real value of the characters by which it is distinguished. This motive induces me to take from the same authority the following table of the relative dimensions of the principal parts of the two species, which I have placed in juxta-position for the purpose of facilitating the comparison.

“ Dimensions :—

	<i>P. auritus.</i>	<i>P. brevimanus.</i>
Length of the head and body from the nose to the root of the tail	1 10	1 6
Length of the head	0 8	0 7
„ of the tail	1 8	1 2
„ of the auricle	1 5	1 0
Breadth of the auricle	0 9	0 5
Length of the tragus	0 7	0 5½
Breadth of the tragus	0 2½	0 2
Length of the arm	0 10	0 7½
„ of the fore-arm	1 5	1 2
„ of the thumb	0 2½	0 3
„ of the phalanges of the middle finger, or the distance from the carpus to the apex of the wing	2 6	1 8
Length of the thigh	0 6	0 5½
„ of the shank	0 8	0 5½
Exsertion of the tail beyond the interfemoral membrane	0 0¼	0 1
Expansion of the flying membrane	10 2	6 6"



CHEIROPTERA.

VESPERTILIONIDÆ.

Genus, *Barbastellus*.

Generic Characters.—Ears moderate, united at the base ; a hollowed naked space on the upper surface of the muzzle, in which the nostrils are placed ; grinders four above and four below on each side.

THE BARBASTELLE.

Barbastellus Daubentonii.

- Vespertilio barbastellus*, GM. SOWERBY, Brit. Miscell. t. v. MONTAGU in Linn. Trans. IX. p. 171. KÜHL, Deutsch. Fle-
derm. sp. 10. DESMAR. Mammal. p. 145. PENN.
Brit. Zool. I. p. 183. JENYNS, Brit. Vert. sp. 38.
La Barbastelle, DAUBENT. Mém. de l'Acad. 1759, p. 381, t. ii. f. 3.
BUFFON, Hist. Nat. VIII. p. 119, t. xix. f. 2.
GEOFFROY, Ann. des. Sc. VIII. p. 196, sp. 6,
t. xlv. xlviii.
Genus *Barbastellus*, GRAY, Zool. Journ. vol. ii.
Plecotus barbastellus, LESSON, Mam. FLEM. Brit. An. p. 7.

ALTHOUGH long known as a native of France and of some other parts of the Continent, it is only of later years that the Barbastelle has been discovered to inhabit this country. It was first described by Daubenton in 1759, in the Memoirs of the Academy of Sciences, and subsequently

by Buffon in his great work. Kuhl, notwithstanding the extent of his researches on the Bats of Germany, and his exertions to procure all that exist in that country, failed to obtain one of this species; but Desmarest states that it is found there, though very rarely. Its first detection as a native of Great Britain is due to Mr. Sowerby, who published an account of it with a figure in the *British Miscellany*. His specimen was found in the powder-mills at Dartford in Kent. In the ninth volume of the *Linnean Transactions*, Colonel Montagu mentions two places in Devonshire, Milton and Kingsbridge, in each of which a specimen was taken. Mr. Gray, indeed, in his enumeration of the Bats of Great Britain in the second volume of the *Zoological Journal*, doubts the identity of Colonel Montagu's specimens with the *Barbastelle*, because the individual marked by Montagu *Barbastellus*, in the British Museum, is undoubtedly *Vespertilio mystacinus*. Montagu's description, however, is so full and so correct, that it appears impossible for him to have been mistaken in the specimens from which he drew it up.—In addition to these localities, Mr. Jenyns states that it has been obtained in Northamptonshire and Cambridgeshire. Having received, by the kindness of my friend Dr. Waring, a very healthy individual, which I kept alive for several weeks, I am enabled to give a few slight notices of its habits, though, of course, only as modified by being in a state of confinement.

It was taken during a very hard frost, in the latter end of December, in a large chalk cavern at Chiselhurst in Kent, which is excavated at the bottom of a shaft seventy feet deep. In this cavern, during very severe frosts, several species of Bats are found to retreat; and on this occasion, I received with the *Barbastelle* a specimen of *V. mystacinus*, three of *V. Nattereri*, and several of *Plecotus auritus*. My little

prisoners, when brought into a warm room, soon began to exhibit signs of vivacity; and the Barbastelle, with the others, fed readily on small bits of meat, and drank water. He was a timid animal, and did not evince the slightest disposition to become acquainted with me; he would take his food, however, with his companions, and was accustomed to rest with them in a cluster, at the top of the box in which they were placed. The Barbastelle certainly became torpid more readily than any of the others, and more completely so; but when awake, evinced extreme restlessness, and was incessantly biting with great violence at the wires of his box. When suffered to fly about the room, he flew very low, and less actively than any other under similar circumstances; and he was fond of lying before the fire on the hearth-rug, where he appeared quite to luxuriate in the warmth. Whilst the Long-eared Bats evinced much attachment to each other, and became very familiar with me, the Barbastelle remained sullen and apart; until at length I found that he was an object of persecution on the part of his more active companions, one of whom I detected in the act of giving him a severe bite on the back of the neck. This occasioned his immediate removal to another box; but this sharp discipline probably hastened his death, which took place about a week afterwards, though he continued to eat till the day before he died. The specimen was a male, and apparently adult.

The situation in which my specimen was found perfectly agrees with the observation of M. Geoffroy, who says, "Je l'ai trouvé à de grandes profondeurs dans les souterrains des fortifications de Charlemont."

Daubenton's figure of the head of the Barbastelle is very correct; that of Geoffroy in the *Annales du Muséum* is excessively bad. The descriptions of both are meagre, and there is no information afforded by any author I have met with

as to the animal's habits, excepting by M. Frederic Cuvier, who relates the history of one which he had in confinement for a few days. It was retained as a species of the genus *Vespertilio*, until M. Lesson placed it with the Long-eared Bat in the genus *Plecotus*. Mr. Gray constituted it a distinct genus under the name of *Barbastellus*, but without any specific appellation; a deficiency which I now venture to supply by the name of the distinguished naturalist who first discovered it.

In its affinities the Barbastelle appears to me to form a link between *Plecotus* and *Rhinolophus*; and thus, though itself constituting a genus of the family *Vespertilionidæ*, it probably leads to the *Rhinolophidæ*, or the family of *Bats having nasal appendages*.

The aspect of this Bat is more remarkable than that of any other of our native species, with the exception of the two species of *Rhinolophus*. The muzzle is truncated, and a groove leads on each side upwards to the nostrils: these are placed in a hollow on the upper surface of the muzzle, which is naked, and extends back to the union of the ears. The cheeks are rather tumid, and covered with black hair, which forms a sort of moustache. The ears are about the length of the head, nearly as broad as they are long, and irregularly four-sided; the inner edges are turned back, forming a longitudinal groove just within the margin; the outer and superior angle prominent, rounded, and turned back: immediately beneath this, on the external margin, is a rather deep notch, from which five or six slight transverse folds extend about half-way across the ear: the anterior and inner angles unite immediately behind the muzzle. The tragus is more than half the length of the ear, of an irregular lanceolate or semicordate form, with a protuberance near the outer angle of its base; the terminal third is linear, and the apex rounded. The eyes are very

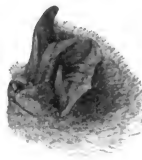
small, placed close to the base of the auricle, (not within it, as generally described,) and almost concealed by the hair on the cheek. The fur of the body is long and soft. The interfemoral membrane is full, and furnished with about twelve transverse lines. The tail extends about a line beyond the membrane.

The general colour of this Bat is darker than that of any other British species; it is nearly black on the back, with here and there a few white hairs, which become more numerous with age; the hinder parts are reddish brown: the belly is lighter than the back, the hair being greyish at the tips, and black at the roots. The ears, the naked part of the muzzle, and the flying membrane, are of a dusky black. Dimensions :—

	Inch.	Lines.
Length of the head and body	2	0
„ of the head	0	7
„ of the tail	1	9
„ of the ears	0	6
„ of the tragus	0	1½
„ of the fore-arm	1	4½
Extent of the wings	10	5

Dentition :—

$$I. \frac{4}{4} : C. \frac{2}{2} : F. M. \frac{4}{4} : M. \frac{2}{2} = 1\frac{1}{2}.$$





Genus, *Rhinolophus*. (Geoff.)

Generic Character.—Cutting teeth $\frac{3}{4}$, grinders $\frac{3}{4}$: $\frac{3}{4}$. Nostrils with two foliaceous appendages, the posterior one erect. Ears lateral, free; tragus wanting.

GREATER HORSE-SHOE BAT.

Rhinolophus Ferrum-equinum.

Specific Character.—Posterior nasal appendage lanceolate, expanding laterally at the base; ears transversely ridged.

- | | |
|-------------------------------------|---|
| <i>Vespertilio Ferrum-equinum</i> , | LINN. GMEL. 50. MONT. LINN. TRANS. IX. p. 122. |
| <i>Rhinolophus unihastatus</i> , | GEOFF. ANN. MUS. XX. p. 257, sp. 1. DESMAR. Mammal. p. 125. sp. 184. GRAY, Zool. Journ. II. p. 109. |
| <i>Noctilio Ferrum-equinum</i> , | KUHL, Deutsch. Flederm. sp. 15. |
| <i>Rhinolophus Ferrum-equinum</i> , | LEACH, Zool. Miscell. III. p. 2. FLEM. BRIT. AD. sp. 1. JENYNS, BRIT. VERT. p. 19, sp. 23. |
| <i>Le grand Fer-à-cheval</i> , | DAUBENT. Mém. Acad. 1759, p. 382. BUFFON, Hist. Nat. VIII. t. xx. f. 1, 2. |
| <i>Horse-shoe Bat</i> , | PENN. BRIT. Zool. I. p. 147, t. xiv. |

THE whole of the singular family to which the present genus belongs are distinguished by the existence of a cuta-

* Insectivorous Bats, with complicated nasal appendages.

neous developement upon the nose, which in some is perfectly simple, in others more or less complicated. In the genus *Rhinolophus* these nasal appendages are more complicated than in any other, consisting of a posterior and an anterior portion, the former of which is erect, hastate or lanceolate, and placed at the base of the forehead; the latter shaped somewhat like a horse-shoe, (from whence the various names which have been given to these Bats are derived,) bordering the upper lip, extending backwards to the posterior leaf, and enclosing the nostrils within its arch.

The use of this very remarkable structure it is perhaps difficult to explain. Geoffroy has suggested that it may be intended to close the nostrils when they are not required to be brought into use; and he instances some analogous modes of closing the orifices of other organs of sense. But when the extent and complication of these foliaceous structures are considered, and compared with the small simple orifice of the nostril, which could be much more readily and perfectly shut by a simple valvular thickening of one of its margins, there is so obvious a want of relation between the object and the means of effecting it, as to render such a supposition wholly untenable. Is it not more consistent with probability, more consonant with the exact adaptation of means to their effects—of structure to its office, which we see in all the operations of creative wisdom, to look rather for an extraordinary extension of the sense of smelling, to be provided for by this development of a fine naked skin immediately around the organ of that sense? And although the object of its existence in one family of the Bats only, cannot perhaps be very certainly accounted for with our present slight knowledge of their habits, the circumstance of the Horse-shoe Bats choosing for their place of retirement the deepest recesses of caverns, beyond the reach of daylight, may perhaps afford some clue

to a not irrational solution of the question. We are perhaps too apt to consider the time passed by Bats in their diurnal retirement, as wholly spent in inactivity and sleep. This, however, is by no means the case, as every one must have observed who has kept these little creatures in confinement : and whatever may be the objects of their temporary and partial activity, the animals of the present group probably fulfil them by means of the senses of smelling and hearing, which are thus, as it were, substituted for that of vision in their obscure retreats ; whilst the former family, the *Vespertilionidæ*, retiring, as they do, to situations from whence the light of day is not wholly excluded, are enabled to pursue the same objects by the exercise of sight.

A very remarkable peculiarity is said to appertain to the Bats of this family ; which is the existence of a pair of inguinal teats, in addition to the pectoral pair which belong to the whole order. They have been observed by numerous Continental authors, and were also discovered by Montagu when searching for certain parasites which infest these animals. Geoffroy is so certain of their being true mammary teats, that he at once goes into his favourite theory of analogies to account for and to support this opinion : and certainly, if his statement be correct, this is not the most remarkable instance of a deviation from a similar rule ; for, says he, “ étant en 1827 à Marseilles, on m’y a fait connaître une femme qui avoit également nourrit ses enfans par une mammelle surnuméraire inguinale ” ! Kuhl, however, who appears to have paid particular attention to this subject, declares that the supposed inguinal nipples in *Rhinolophus* are nothing more than cutaneous warts, (more probably sebaceous glands,) and that there is not the slightest appearance of mammary glands beneath them.

The Great Horse-shoe Bat forms one of the numerous

additions which were made by Daubenton to our knowledge of European *Cheiroptera*. It was first ascertained to be British by the venerable Dr. Latham, by whom it was communicated to Pennant, who published it in the fourth edition of his British Zoology. Dr. Latham's specimen was taken in the saltpetre-houses belonging to the Dartmouth powder mills. It has since been found in many localities; in Bristol and Rochester Cathedrals, in caverns at Clifton, at Colchester, and some other places. Montagu found it in considerable numbers, in company with the Smaller Horse-shoe Bat, in the well-known cavern near Torquay, called Kent's Hole,—a retreat so dark and gloomy, that no other species, even of this lucifugal family, were found to frequent it. The French naturalists equally record the retreat of this species to be chosen in the darkest and least accessible caverns, in abandoned quarries, and other subterraneous excavations. It is said to feed much upon chafers, of which it eats only the body.

The distinctions between this species and the following will be detailed in the account of the latter. They are not very considerable, nor, excepting in that of size, very obvious on a casual examination. The best figure of the present species with which I am acquainted is that of Buffon, but most others are very poor; and even the outline of the nasal appendage which accompanies Montagu's paper in the Linnean Transactions is far from being accurate.

The head is long, the occiput large and rounded, the muzzle very tumid and furnished with long stiff hairs. The mouth opens straight and wide: the upper incisores are extremely small, distant, and early deciduous; the inferior ones are broad at the crown and three-lobed. The anterior nasal leaf is horizontal, shaped like a horse-shoe, anteriorly emarginate, formed of three concentric elevations, the inner one

thickened. This membrane embraces the nostrils, which are placed between it and a cup-shaped process, the top of which forms a hood, sustaining a compressed crest. The frontal leaf is pointed, the upper part narrow, suddenly spreading out beneath into two lateral expansions, and ciliated with stiff hairs. Ears very large, lateral, slightly hairy, particularly on the outer surface; the apex curved a little outwards; the outer margin moderately sinuate, with transverse sulci extending half-way across the ear; inner margin somewhat expanded: a large half-round lobe is placed at the base of the ear, which it is capable of accurately closing. The forehead and rest of the head, as well as the body, covered with long soft fur.

Colour above reddish grey, very pale grey beneath; membrane dusky; ears paler. Dimensions:—

	Inch.	Lines.
Length of the head and body	2	5
„ of the head	0	11
„ of the ears	0	9
Breadth of the ears	0	6
Length of the tail	1	2½
Expansion of the wings	13	0

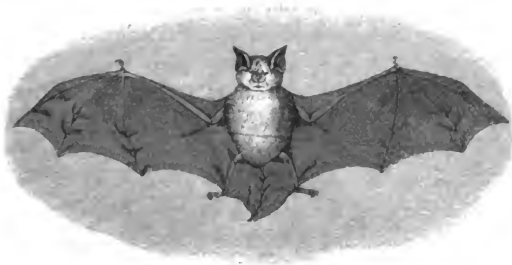
Dentition:—

$$I. \frac{2}{4} : C. \frac{2}{2} : F. M. \frac{4}{4} : M. \frac{6}{6} = \frac{14}{4}.$$



CHEIROPTERA.

RHINOLOPHIDÆ.



LESSER HORSE-SHOE BAT.

Rhinolophus hipposideros.

Specific Character.—Posterior nasal appendage lanceolate, without lateral expansions at the base : ears deeply sinuous at the outer margins ; the transverse sulci obsolete.

- Vespertilio Ferrum-equinum*, β , GMEL. LINN. 50.
 „ *minutus*, MONTAGU, Linn. Trans. IX. p. 163.
 „ *hipposideros*, BECHSTEIN.
Rhinolophus bihastatus, GEOFF. Ann. Mus. XX. p. 259, t. v. DESMAR.
 Mamm. p. 125. sp. 185. GRAY, Zool. Journ.
 II. p. 109.
 „ *hipposideros*, LEACH, Zool. Misc. III. p. 2, t. cxxi. FLEM.
 Brit. An. p. 5. JENYNS, Brit. Vert. p. 20.
Petit Fer-à-Cheval, DAUBENT. BUFFON, Hist. Nat. VIII. p. 131,
 t. xvii. f. 2.

THIS species so nearly resembles the Greater Horse-shoe Bat, that it was long considered as merely a variety of it. Gmelin gives it as such, quoting the two as the *V. Ferrum-equinum major* and *minor* of Schreiber ; and although Daubenton was well aware of the distinctions between them, there is nothing in his descriptions which can lead us to sup-

pose that he had formed any more distinct opinion. Montagu appears not only to have been the first who discovered the Smaller Horse-shoe Bat to be an inhabitant of this country, but to have first ascertained that the characters in which they differ from each other are not those of mere varieties, but essentially specific; and he named the smaller one *Vespertilio minutus*,—a name however which, for obvious reasons, cannot be retained. Bechstein assigned to it a specific appellation, which, though not the best that might have been chosen, as being the mere translation into Greek of that of the former species, is now established, and has received the sanction of Leach and of subsequent writers. Geoffroy's names of *unihastatus* and *bihastatus* are founded upon error, and were also applied later than those which I have here employed.

This species is found with the former, being similarly fond of the darkest and most concealed places of retirement. It was first taken by Montagu in Wiltshire, in a hollow over a baker's oven, having entered the place through a small fissure; and afterwards in a dark old shed surrounded by high trees, at Lackham in the same county. He also obtained it with the former species in Kent's Hole, an extensive limestone cavern near Torquay in Devonshire, where it was observed in considerable numbers clinging to the vaulted roof of the interior apartments. Dr. Leach states that "it is a very cautious animal; very easily tamed, but fond of concealing itself. It frequents the higher parts of the caverns in which it occurs, and probably flies higher than the preceding species."

Its great resemblance to the former renders it unnecessary to give a lengthened description of it. The nasal appendage is very similar in most of its parts; the erect process between the nostrils is much less cupped at the base, and the hood at

the top is less prominent : at the anterior part of the base of the frontal leaf is a short additional one, which has given rise to the name of *bihastatus*, assigned to this species by Geoffroy ; the frontal leaf itself is lanceolate, broader than in the *Ferrum-equinum*, and without any lateral expansions. The ears are rather more deeply sinuate on the outer margin, and the transverse sulci scarcely apparent—a peculiarity which is well preserved in Buffon's figure,—and the lobe is larger in proportion. The muzzle is less tumid. The fur is equally soft and full ; and the colours are very similar, the upper part being a little browner, and the under part rather more yellow. Dimensions :—

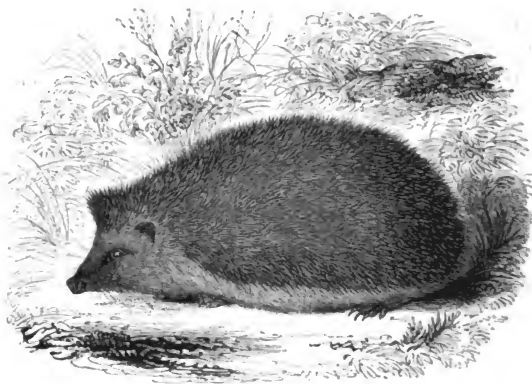
	Inch.	Lines.
Length of the head and body	1	4
„ of the head	0	8
„ of the tail	0	9
„ of the ears	0	5
Breadth of the ears	0	4
Extent of the wings	8	5

The formula of the teeth is the same as in *Rhinolophus Ferrum-equinum*.



INSECTIVORA.

ERINACEADÆ.

Genus, *Erinaceus*. (Linn.)

Generic Character.—Middle incisive teeth very long, standing forward; the upper ones cylindrical, apart: grinders $\frac{4}{4}$: body covered with spines: tail very short.

HEDGEHOG. URCHIN.

Erinaceus Europæus.

Specific Character.—Ears less than half the length of the head; spines not longer than the head.

Echinus sive erinaceus terrestris, RAY, Syn. Anim. Quad. p. 231.

Erinaceus Europæus,

LINN. Syst. Nat. p. 75. DESMAR. Mammal.

p. 147. sp. 229. FLEM. Brit. An. p. 7.

JENYNS, Brit. Vert. p. 19.

Le Hérisson,

BUFFON, Hist. Nat. VIII. p. 28, t. vi.

Common Urchin,

PENN. Brit. Quad. I. p. 133.

Hedgehog,

SHAW, Gen. Zool. I. p. 542, t. cxxi.

DEPRIVED by its structure of all means of attacking its enemies, of defending itself by force, or of seeking safety in flight, this harmless animal is yet endowed with a safe-

guard more secure and effectual than the teeth and claws of the Wild Cat, or the fleetness of the Hare. Its close covering of sharp spines,—which are hard without brittleness, sufficiently elastic to bear great violence without breaking, and fixed with astonishing firmness in the tough, leathery skin,—forms not only a solid shield to protect it from the effects of blows or falls, but a shirt of prickly mail sufficiently sharp and annoying to deter all but a few thoroughbred Dogs, or a half-starved Fox, from venturing to attack it. Immediately that it is touched, or that it sees danger approaching, it rolls itself up into a compact round ball, by the contraction of the powerful muscles which cover the body immediately under the skin, and presents this impenetrable panoply, beset by innumerable spines standing out in every direction; and the more it is irritated or alarmed, the more firmly it contracts, and the more strongly and stiffly the spines are set. The strength and elasticity of this covering is such, that I have repeatedly seen a domesticated Hedgehog in my own possession run towards the precipitous wall of an area, and, without hesitation, without a moment's pause of preparation, throw itself off, and contracting at the same instant into a ball, in which condition it reached the ground from a height of twelve or fourteen feet, after a few moments it would unfold itself and run off unhurt.

The assertion of Pliny, followed by his numerous plagiarists, and amongst them by the greatest of all, Buffon, that the means of defence just described are aided by another of a very different character—the expulsion of its urine, namely, in such a manner that it spreads itself over the whole surface of the skin, and by its odour disgusts and repulses its assailants,—appears at least to be unsupported by later observation, and is probably a mere invention. *Ælian*,

indeed, mentions the same fact, but with reference to a different object: "As soon as a Hedgehog is captured," says he, "he sprinkles his body with urine, and renders useless a part which is in itself so useful:" alluding, doubtless, to the use made by the Romans of the prickly skin of the Hedgehog in hackling hemp for the weaving of cloth.

However effectual this defensive armour may be in most cases, it now and then happens that a well-trained and thorough-bred wire-haired Terrier is found hardy and bold and active enough to "open" a Hedgehog, at the expense of a bloody nose and sorely-pricked paws. This, however, is rare; and it may be safely asserted that scarcely any animal is so admirably provided with means of self-preservation, which the absence of the usual methods of escape or of resistance render so necessary.*

The food of the Hedgehog is very various: it is, however, certain that it lives by preference upon animal food, though it will readily eat many vegetable substances. Its usual aliment is insects, worms, slugs, and snails; but it goes higher in the scale of gastronomic enjoyment, devouring frogs, toads, mice, and even snakes. The mode in which it attacks the latter animals is given in a manner worthy of the good old historian of Selbourne himself, in a communication of my friend Mr. Broderip, in the first volume of the *Zoological Journal*. The experiment was made by Professor Buckland, and is thus detailed:—"Having occasion to suspect that Hedgehogs, occasionally at least, preyed on snakes, the professor procured a common snake, and also a Hedgehog, and put them into a box together. Whether or not the latter recognised its enemy was not apparent; it did not dart from the Hedgehog, but kept creeping gently round

* I beg to refer the reader to *Ælian*, lib. vi. cap. lxiv. for a curious story of the method which the Fox is said to employ to force the Hedgehog to open.

the box ; the Hedgehog was rolled up, and did not appear to see the snake. The professor then laid the Hedgehog on the snake, with that part of the ball where the head and tail meet downwards, and touching it. The snake proceeded to crawl—the Hedgehog started, opened slightly, and seeing what was under it, gave the snake a hard bite, and instantly rolled itself up again. It soon opened a second, and again a third time, repeating the bite ; and by the third bite the back of the snake was broken. This done, the Hedgehog stood by the snake's side, and passed the whole body of the snake successively through its jaws, cracking it, and breaking the bones at intervals of half an inch or more ; by which operation the snake was rendered motionless. The Hedgehog then placed itself at the tip of the snake's tail, and began to eat upwards as one would eat a radish, without intermission, but slowly, till half the snake was devoured. The following morning the remaining half was also completely eaten up."

The fondness of the Hedgehog for insects occasions it to be kept in many houses in London for the purpose of ridding the kitchens of the innumerable hosts of cockroaches by which they are infested, and also renders it useful rather than noxious to the gardener and the farmer. Sir William Jardine, however, mentions their fondness for eggs, and states that they do considerable mischief by destroying game in the breeding season, and that they will even enter a hen-house, and turning the hen off her nest, proceed to devour the eggs.

That the Hedgehog therefore is no less an animal-feeder in fact, than related to the insectivorous group by its zoological characters, is thus sufficiently proved ; but, as in many other cases, it is not so exclusively restricted to one description of food, as to be at all inconvenienced when obliged by

circumstances to resort to a different one. Thus it will not only feed readily on soaked bread or dressed vegetables when in a state of confinement, but in a more natural and free condition, when turning up the ground, probably in search of worms, it will eat the roots of grass or other plants; and in a garden will eat the ripe fruit which falls from the trees. "The manner in which they eat the roots of the plantain in my garden," says White, "is very curious: with their upper mandible, which is much longer than their lower, they bore under the plant, and so eat the root off upwards, leaving the tuft of leaves untouched." There is an ancient prejudice still prevailing amongst the common people throughout this country, that it sucks the cows during the night, thus disappointing the milk-maid of the expected repletion of her morning pail. This, however, is about as well-founded an accusation as that of Pliny, exaggerated as it is by Sperling, who assures us that it ascends trees, knocks off the apples and pears, and throwing itself down upon them that they may stick to its spines, trots off with the prize! Ælian gives us the same story, substituting figs for apples, and omitting the climbing power of the animal.

It is easily rendered familiar, and will soon partake, without fear, of the food of the other domestic pets, the Dog or Cat, eating at the same time with them, and from the same dish. A friend of mine has one which will unfold and lie on his knees before the fire, suffering him to rub the naked parts of the face, from which it appears to derive great pleasure.

In its natural state it is strictly nocturnal, remaining coiled up in its retreat during the day, and running about all the night in search of food. Its run is quick and shuffling, and as it were by starts, but is not continued to any considerable distance at once.

The hibernation of the Hedgehog is, perhaps, as complete as that of any animal inhabiting this country; and much more so than that of many of the *Rodentia*, which retire indeed to winter retreats, but awaken at intervals, to eat of their treasured hoard of nuts or grain, when called into temporary life by a day of unwonted mildness. The Hedgehog, on the contrary, lays up no store for the winter, but retires to its warm, soft nest of moss and leaves, and rolling itself up into a compact ball, passes the dreary season in a state of dreamless slumber, undisturbed by the violence of the tempest, and only rendered still more profoundly torpid by the bitterest frost. Its usual retreats are in the hollows of trees which are decayed at the bottom of the trunk; underneath its base, where the earth has been washed away from under the huge naked roots; in holes of rocks; or in any similar protected excavation.

The female produces from two to four young ones early in the summer: at birth they are blind, and covered with nascent spines, which are white, soft, and flexible at first, but become hard in the course of a day or two. The nest is formed with considerable art; and the roof, even where there is no other covering, is capable of throwing off the rain, and preserving the interior entirely dry. Buffon relates that he has repeatedly placed the mother with the young in a place of confinement; but that, instead of suckling them, she invariably killed and devoured them, notwithstanding she was provided with plenty of food. The same naturalist has a sufficiently absurd story respecting the breeding of these animals, which, as well as many other fables, he has copied implicitly from the credulous Pliny, who, however, received it from no less an authority than Aristotle himself. By the eloquence of his diction, and his great popularity, Buffon has been the means of perpetuating this, with innumerable other

errors. I refer the reader to Pliny's account,* and leave the matter with this simple caution, that the notion is as unfounded as it is ridiculous. The whole account of the *Hedgehog* as given by the celebrated French naturalist above named, with the exception of a few facts which occurred within his own observation,—and they are very few,—is, in truth, little more than a mere translation of the statements of *Ælian* and *Pliny*, polished and ornamented indeed in style, but very little improved in correctness, or extent of information.

The flesh of this animal is eaten in some parts of the Continent, and there are very contradictory accounts of its degree of excellence; some considering it excellent food, and others, on the contrary, declaring it to be ill-flavoured and rank.

There has existed in France, for a long period, an opinion that there are two species of *Hedgehog* indigenous to that country; one of which is said to have the snout of a *Hog*, the other the muzzle of a *Dog*. *Perrault*, who has given the only existing figure of the latter form, appears to have held this opinion, and to have supported it, at least to his own satisfaction, by dissections. *Ray* declares that one of them certainly does not exist in England, and seems to doubt its reality. *Daubenton* also states that he examined two males, said by the country people to belong to the two sorts above named; and that although he found considerable diversity in the dimensions of the various parts, as well as in the size and weight of the individuals, he comes to the conclusion that these distinctions constitute them varieties only of the same species.

The body of this animal is oblong, regularly convex above; the head very conical; the ears short, broad, and

* *Plin. Hist. Nat. lib. VIII. c. xxxvii.*

rounded; the eyes prominent. The teeth are thirty-six in number. The central incisive teeth in the upper jaw are long and robust, separated to a great extent above, slightly approximating towards the points, at which part, however, they are still distant; the second and third on each side are small, particularly the second, and conical, resembling false molars. There is a small space between the third incisor and the next tooth: this, in the opinion of M. Frederic Cuvier, is a false molar, though Desmarest and others consider it a canine; a class of teeth which, according to the former celebrated zoologist, is absolutely wanting in this genus. This tooth has two roots. There are two other false molars, smaller than the former, the last having an internal tubercle. The first three true molars are large, nearly quadrate, and furnished with strong, acute tubercles; the second of these is the largest; the last molar is a small tooth, placed obliquely, and having in some measure a cutting edge. In the lower jaw the central incisive teeth stand nearly forwards, and much resemble those of the upper jaw. The three following teeth are considered by M. Frederic Cuvier as false molars: if this be correct, there are but two incisive teeth in the lower jaw. The two anterior false molars stand forwards, and are very similar to the lateral incisive teeth of the upper jaw; the third is nearly perpendicular. The first true molar is an oblique tooth, with two principal tubercles; the second and third are broad strong teeth, having five and four tubercles; and the fourth is very small.

The neck is short. The whole body is covered above and at the sides with numerous sharp, hard, round spines, attenuated at each extremity, about an inch in length, arranged as it were in groups, generally diverging in all directions, but capable of being arranged with some degree of regularity. Their colour is a dirty white, with a brown or

blackish ring rather above the middle. Legs very low, so as to allow the belly nearly to touch the ground when the animal is running. Snout, forehead, sides of the head, sides, and under part of the tail, throat, breast, and legs, covered with hard brittle hair of a yellowish white colour.

Dimensions :—

	Inch.	Lines.
Length of the head and body	9	6
„ of the head	3	0
„ of the tail	0	9
„ of the ears	1	0



INSECTIVORA.

TALPIDÆ.

Genus, *Talpa*. (Linn.)

MOLE.

Generic Character.—Incisive teeth $\frac{3}{2}$, equal, or nearly equal; canines large, triangular, compressed; grinders $\frac{2}{2}$: body almost cylindrical, covered with short, fine, soft hair; fore-feet very broad, the palms turned outwards, formed for digging; tail short; no external ears; eyes extremely minute.

THE COMMON MOLE.

MOLDWARP (*Scotticè* MOUDIEWARP). WANT.*Talpa vulgaris*.

Specific Character.—Incisive teeth all equal; eyelids open.

Talpa Europæa, LINN. Syst. Nat. p. 73. DESMAR. Mammal. p. 160, sp. 250.

FLEM. Brit. An. p. 18. JENYNS, Brit. Vert. p. 17. BONAP. Faun. Ital.

„ *vulgaris*, BRISSON, Reg. An. p. 281, sp. 1. IS. G. St. HILAIRE, Dict. Class. d'Hist. Nat. XVI. p. 70.

La Taupe, BUFFON, Hist. Nat. VIII. p. 81, t. xii.

Mole, PENNANT, Brit. Zool. I. p. 128. SHAW, Gen. Zool. I. p. 515, t. cxvii.

A SUPERFICIAL view of the form and habits of the Mole is but ill calculated to excite any desire to cultivate a more

intimate acquaintance with its history. Blind, awkward, and shapeless,—condemned to a life of incessant toil in subterranean darkness, its very existence only indicated by the ravages which it perpetrates in our fields and gardens,—the sole feeling which it excites in the mind of a casual observer is pity for the gloomy and laborious life to which it is subjected, or a determined hostility and desire for its extermination.

But if, on further investigation, this animal, apparently so helpless and miserable, be shown to possess as numerous and efficient means of happiness as any of the more obviously favoured species,—if, in addition to immense strength, undaunted courage, and indefatigable perseverance, we find that it evinces the skill of a consummate engineer, an unerring and varied instinct, and the most ardent conjugal attachment,—how different are the feelings with which we contemplate the former object of our contempt and pity! There is, however, another side to this picture. Interesting as its habits and instincts are to the naturalist, who sees in them only fresh proofs of the wisdom and beneficence of the Creator, which can render a life so apparently incompatible with comfort, in reality one of almost incessant enjoyment, the agriculturist looks with far different eyes upon the devastations committed in the different labours to which its varied instincts direct it, in the long subterranean galleries, the upheavings of the soil, and the superficial traces which it forms,—all of which he deprecates, whether deservedly or not, as so many causes of serious injury to the district which the intruder has chosen for its own domain.

The one prominent circumstance which strikes us on looking either at the habits or structure of the Mole, is that labour—hard and almost incessant labour—is its necessary doom. Its feeding and its habitation, its wanderings and

its repose, its winter retreat, and the nest in which its young are brought forth and nourished, are all so many calls for the most laborious and enduring toil : but, on the other hand, that toil is so amply provided for in the whole structure of the animal, so exactly balanced by the strength and conformation of its limbs, that it cannot be considered as exceeding the healthful and even pleasurable exercise of its natural powers. The general form of the body, which is nearly cylindrical, is calculated to facilitate its rapid progress through the subterranean passages which form its only routes of communication between the different parts of its domain ; whilst its soft and silky fur, which, from its being inserted in the skin perpendicularly to its surface, will lie indifferently in any direction, offers no obstacle to its retrograde retreat when it meets with any opposition to its progress. The anterior extremities exhibit the most admirable conformation for the purpose of excavating its way through the soil. The strength and peculiar structure of the bones of the shoulder and of the fore-arm are in harmony with the remarkable form and direction of the hand. The joints of



the fingers are extremely short, with the exception of the terminal ones, which are almost as long as the rest of the hand : these are convex above, grooved beneath, taper at the extremities, at which part they approximate to each other,

and each is furnished with a long acute nail. The palms are directed outwards: the hand is only susceptible of being partially closed, which is effected by the inclination of the terminal joint alone. When thus bent, the hand is formed of two portions; the one consisting of the palm turned outwards, and the other formed of the terminal joint of the fingers, the direction of which is backwards: a structure which at once explains the manner in which the earth and the smaller fibres of roots which are intermixed with it are, as it were, hoed away, and thrown directly backwards behind the animal. When at work, the tail is either carried erect, or laid along the back.

But the Mole is not always employed in digging its weary and laborious way through the solid earth: it runs along its subterranean galleries and passages, and sometimes also on the surface of the ground, with considerable rapidity. This requires a very different construction of the feet from that which has been just described. It is, in fact, principally by means of the hinder feet, which are truly plantigrade, that the act of running or walking is effected. These are either placed under the belly, or at the sides, as they press either against the inferior or lateral parietes of the passage, and thus act as in other instances of plantigrade progression. The hands, however, are not without their use in this action, in which they are employed in their bent position, the extremities of the fingers acting either on the floor or sides of the passages.

Another very important organ in the peculiar mode of life to which the Mole is subjected, is the elongated muzzle. This part projects considerably beyond the maxillary bones, and consists of the cartilages of the nose, perforated by the nostrils, which are perfectly cylindrical tubes, elastic, flexible, and strengthened by a little bone at the extremity.



This curious organ appears, from the observations of Geoffroy St. Hilaire, to be employed in two very different offices;—as a true organ of prehension, for seizing and bringing to the mouth its food and other matters; and as a boring instrument for perforating the earth, and thus acting in conjunction with the hands in the process of excavation. But whilst the external appendages to the organ of smell are thus beautifully developed for purposes remote from its primary object, the sense itself and its more immediate seat are found to occupy a very prominent place in the sentient organization of the animal. The sense of sight, so important to most others, would in the present case be useless, at least during by far the greater portion of its existence; and hence we find that it is reduced to its minimum of developement, and sacrificed, as it were, to the necessary pre-eminence of that of smelling. There can, indeed, be no doubt that to the latter sense the Mole is indebted for the perception of its food, of its enemies, and of its mate: at the same time it appears to be much assisted by that of hearing, which, without the usual aids of an external conch, is certainly very acute. Shakspeare was not unmindful of this fact—

“ Pray you, tread softly, that the blind Mole may not
Hear a foot fall !”

and the Mole-catchers are accustomed to prefer windy nights

for the prosecution of their business, that their tread may not be distinguished by the object of their pursuit.

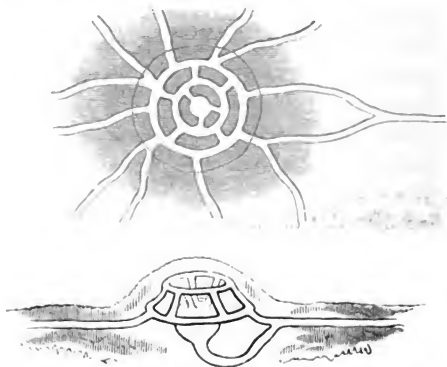
This is not perhaps the proper place to enter into an anatomical discussion to decide the long-contested and interesting question, whether the Mole possesses true vision or not. The actual existence of a visual organ, though in an imperfect state of developement, is well known; and the open condition of the eyelids, in the common species at least, would lead to the conclusion that this sense is not absolutely wanting to it. But the following experiment, instituted by Le Court, witnessed and recorded by Geoffroy St. Hilaire, appears to set the question at rest. It was made for the purpose of satisfying the doubts of this celebrated physiologist, and was conducted in the following manner:—A disused water-pipe or gutter was selected, in which were two openings, one forming the entrance, the other the exit. Into this tube several Moles were successively introduced, Le Court and his companion watching at the opposite opening. Whilst they remained perfectly motionless, the Mole quickly traversed the pipe and escaped: but if, on making its appearance at the opening, a finger were but raised, it was sufficient to check its progress, and to occasion its precipitate retreat. This was repeatedly tried, and with the same invariable result.

But, it may be asked, if the Mole be really possessed of vision, how can we reconcile to this fact the decided declaration of so acute and accurate an observer as Aristotle, that it is absolutely blind? It is not improbable that the solution of this difficulty rests in the existence, now well ascertained, of a second species of Mole, indigenous, like the present, to the south of Europe, the eyelids of which are totally closed, whilst those of the common one are so far separated as to allow the entrance of light; and it may be

supposed that the former was the one which usually fell under the observation of that extraordinary man. To this second species I shall have occasion to revert.

The organization which I have thus slightly sketched, is destined to the fulfilment of instincts the most interesting and curious. Every one is aware of the fact that the Mole burrows for its food, that its nest is formed under ground, that a larger hillock than the rest is raised for the reception of its young: but it is not so generally known that its subterranean excavations are of the most distinct and determinate character, that there are permanent passages or high roads for its ordinary travels from one part of its domain to another; that into these roads open the excavations in which it follows its daily labour in search of food; that its fortress—the house in which it resides from the autumn to the spring—is of a complex and most ingenious structure, and that this domicile is always a distinct and even remote building from that in which the nest is formed. For these and many other interesting particulars in the life and habits of the Mole, we are principally indebted to the researches of Henri le Court, a person who, having held a lucrative situation about the court at the epoch of the French revolution, retired from the horrors of that fearful period into the country, and there devoted the remainder of his life to the study of the habits of the Mole, and of the most efficient means for its extirpation. His discoveries have been recorded by M. Cadet de Vaux, in a work published in the year 1803, and more briefly by Geoffroy St. Hilaire, in his “*Cours d’Histoire Naturelle des Mammifères*.” This distinguished naturalist indeed visited Le Court for the purpose of ascertaining the truth and extent of these discoveries, and of enjoying the facility with which he was enabled by long habit to trace and to demonstrate the various labours of this object of his incessant research.

The district or domain to which an individual Mole confines himself may be termed its encampment. Within its limits, or at least in immediate communication with this district, all the labours of the animal are pursued. It consists of the habitation or fortress, from which extends the high road by which the animal reaches the opposite extremity of the encampment, and of various galleries or excavations opening into this road, which it is continually extending in search of food, and which constitute, in fact, its hunting-ground.



The fortress is formed under a large hillock, which is always raised in a situation of safety and protection; either under a bank, against the foundation of a wall, at the root of a tree, or in some similar locality. The earth, of which the dome covering this curious habitation is composed, is rendered exceedingly strong and solid, by being pressed and beaten by the Mole in forming it. It contains a circular gallery within the base, which communicates with a smaller one above by five nearly equi-distant passages; and the domicile or chamber is

placed within the lower and beneath the upper circular gallery, to which last it has access by three similar passages. From the chamber extends another road, the direction of which is at first downwards for several inches ; it then rises again to open into the high road of the encampment. From the external circular gallery open about nine other passages, the orifices of which are never formed opposite to those which connect the outer with the inner and upper gallery : these extend to a greater or less distance, and, according to de Vaux, return, each taking an irregular semicircular route, and opening into the high road at various distances from the fortress. Such is a very hasty description of this most singular structure ; and nothing surely can be imagined more admirably calculated to ensure the security or the retreat of the inhabitant, than such an arrangement of internal routes of communication as this. The chamber communicating beneath directly with the road, and above with the upper gallery,—this with the lower by five passages, and the latter again with the road by no less than nine,—exhibit altogether a complication of architecture, which may rival the more celebrated erections of the Beaver.

Another very important part of the encampment is the high road, which has been termed by the Continental naturalists “the passage”—a name which affords no distinctive idea of its nature or use. It differs essentially from all the other routes and excavations, both in its construction and use. It extends from the fortress to the extremity of the domain in nearly a direct line, forming in fact the main route of communication between the fortress and the different parts of the encampment ; and the alleys which lead to the hunting-ground, or quarries, open into it on each side. Its circumference is larger than the body of the Mole, though not large enough to admit of two individuals passing each other. The walls are beaten by the frequent pressure of the

animal's sides against them, until they become very smooth and compact: in fact, this road is principally formed by the compression of the earth which surrounds it, rather than by actual excavation; and hence the infrequency of mole-hills over it, compared with the number which are observed in connexion with the alleys and the quarries, in forming which the earth is removed out of the way by being thrown up on the surface. In some instances, the same Mole forms a second and even a third road; but this is generally done in order to extend its operations to a new and more productive district. In other cases, many Moles are known to employ one road, though they never intrude upon each other's hunting-ground: in this case, should two of them meet, one must retreat into the nearest alley, or a battle ensues, which proves fatal to the weaker of the combatants. The road is formed at a greater or less depth from the surface, according to the nature of the soil, the danger of injury from superincumbent pressure, and other circumstances. Thus, in safe situations, where there is nothing to disturb or threaten the security of its roof, it will be found at a depth of about four or five inches; whilst in other places, as under a road or beneath a stream, the earth is left not less than a foot or a foot and a half deep above it.

As it is only by the high road that the Mole can visit the different quarries or hunting-grounds of its domain, it is traversed regularly several times in the course of the day: hence it is only in this route that it can with any certainty be taken, and the traps are therefore always placed in its course by skilful Mole-catchers, so as to intercept the animal, in its journey between the fortress and that alley which may happen at the time to be the seat of its labours.

The swiftness with which the Mole will traverse its domain by means of this principal road, was made the subject of an amusing and satisfactory experiment by Le Court.

Having ascertained the exact direction of the road, and finding that the Mole was engaged in exploring for its food the ground at the farthest extremity from the fortress, he placed along its course at certain distances several pieces of straw, one extremity of which penetrated within the passage, and to the other end was fixed a little flag of paper. He also introduced into the passage near the end, a horn, with the mouth-piece standing out of the ground. Then waiting till he was sure of the Mole's presence at that part of the road, he blew into the horn, to use the words of Geoffroy, "*un cri effroyable*;" when, in a moment, the little flags were successively thrown off, as the Mole, in its rapid course towards its fortress, came in contact with the interior extremities of the straws: and the spectators of this neat and demonstrative experiment affirm that the speed of the frightened Mole was equal to that of a horse at full trot.

The alleys or galleries are opened from the sides of the road, and generally incline a little downwards from their origin towards their termination. I have already stated that the Mole forms the alleys by the expulsion of the earth; whilst the passage, or high road, is formed principally by its consolidation. When an alley is opened, if a plentiful supply of food be found, the Mole proceeds to form various ramifications from its extremity, throwing up fresh mole-hills as it advances in its search after its prey: but if the situation prove but sterile, another alley is opened at a different part of the road. These excavations are more or less deep according to the nature of the soil and the degree of humidity;—circumstances which regulate the situation in which the earth-worms most abound. In forming its runs, or excavating its quarries, it pushes the loosened earth before it till it arrives at the last-formed hillock or mole-hill; and when this becomes too distant, it makes its way to the

surface through the solid earth, forming a new shaft, over which another hillock is gradually made by the successive portions of earth which are brought from the scene of its mining operations.

But the labours of the Mole are not confined to the excavations already mentioned. In lands newly sown, the surface of which is consequently light and yielding, after moderate rain, which has brought the earth-worms to the surface, the Mole follows them, and pursues its chase along the superficial layer of the soil, digging a shallow continuous trench, in which work it advances with great rapidity. It is said that the gravid female, to whom the usual excavations in the subterranean alleys would be too laborious, limits herself principally to this lighter toil.

This description of the different methods in which the animal seeks its food, leads to the consideration of the nature of the food itself. It has been asserted even by Le Court, as well as by many other writers, that it consists not only of earth-worms, insects, and other animal matters, but, in a considerable degree, of many vegetable substances; particularly of the roots of the artichoke, of turnips, potatoes, carrots, and the young tender fibres of the roots of trees. The truth however appears to be, that it is exclusively, or nearly so, an animal-feeder. The experiments of M. Flourens, as recorded by Geoffroy St. Hilaire, are conclusive on this point; and their results are too interesting to be omitted here. It must be premised that the appetites of the Mole, of whatever kind, are extreme in their degree. The Mole, says the latter distinguished naturalist, does not exhibit the appetite of hunger as we find it in other animals; it amounts in it to a degree of frenzy. The animal when under its influence is violently agitated; it throws itself on its prey as if maddened with rage; its gluttony disorders all its faculties, and nothing

seems to stand in the way of its intense voracity. This picture certainly exhibits none of the characters of a vegetable, or even of a mixed feeder; and M. Flourens accordingly found that Moles perished with hunger when supplied with a quantity of various vegetable substances, such as carrots, turnips, and different kinds of herbs. It is true that vegetable matters are occasionally found in the stomach: but this no more proves them to be vegetable feeders, than the accidental reception into the stomach of some particles of sawdust, by a captive Lion, who has had his food thrown to him on a floor covered by that substance, would indicate that the Lion is a feeder on sawdust. The cases are exactly parallel. The Moles gnaw the roots of plants for the purpose of extracting from them such larvæ and worms as feed upon them; they likewise seize upon earth-worms which are entwined amongst the masses of fibrous roots and earth which constitute the superficial layer of grass-lands; and in each case portions of the roots and of the soil itself would be swallowed with its actual food.

The principal object of its search, however, is the earth-worm. In pursuit of this its favourite food, it occasionally follows it towards the surface, with such eagerness that it actually throws itself out of its burrow upon the ground. It has been stated that the Mole will not eat the larvæ of the *scarabæidæ*, and other coleopterous insects that live under the ground; but this is certainly a mistake, as these larvæ have been found in their stomach. It is not, however, to these and similar kinds of food that the Mole is necessarily restricted: a mouse or a bird, a lizard or a frog, if placed within its reach, becomes a speedy victim to its voracity. Toads, however, it rejects, even when famishing with hunger; probably on account of the acrid secretion of the skin, first noticed by Dr. Davy. Geoffroy gives a curious picture of the manner in which it will approach, seize, and devour a

small bird ; exhibiting, in the first place, a considerable exercise of stratagem to get within reach of its victim, and changing on an instant this mode of approach, for the most sudden and impetuous attack ; seizing the hapless bird by the belly, tearing it open, and thrusting its muzzle amongst the entrails, where it appears to luxuriate on its bloody repast. Even the weaker of its own species, under particular circumstances, are not exempted from this promiscuous ferocity ; for if two Moles be placed together in a box, without a very plentiful supply of food, the weaker certainly falls a prey to the stronger. No thorough-bred Bulldog keeps a firmer hold of the object of its attack than the Mole : Mr. Jackson, a very intelligent mole-catcher, says that, when a boy, his hand was so severely and firmly laid hold of by one, that he was obliged to use his teeth in order to loosen its hold.

It is not only in the warm and temperate seasons of the year, when the food of the Mole is of comparatively easy access and exists in great plenty, that its labours are steadily and regularly followed : in the winter, when the frost has penetrated deeply into the soil, and the ordinary hunting-grounds are rendered useless and impracticable, it descends to a considerable depth by a perpendicular shaft, till it arrives at the part to which the earth-worms have been driven by the cold. Here its labours must be even more toilsome and less productive than ordinary ; but the voracity of this indefatigable gourmand must still be appeased ; and as it lays up no store for the winter, and cannot fast with impunity for more than a few hours, it may well be imagined how incessantly and laboriously it must work in such a season, and at so great a depth, to obtain a sufficient supply of worms to satisfy its insatiable craving. This rage of hunger alternates with the most profound repose, which the animal enjoys either within its fortress, during the season in which that

domicile is occupied, or in a simple mole-hill, devoted to this purpose, during the summer. Its bed is formed of various vegetable matters, such as grass, leaves, or similar soft substances. It sleeps for about four or six hours at a time in warm weather, and principally during the day; its usual working time being very early in the morning and at night.

In the spring, the Mole leaves the fortress, and does not return to this shelter until the autumn, when it does not generally reoccupy the same edifice, but constructs another; leaving the old one to the occupation of the Field Mouse, or other small animal of similar habits. During the month of June, or longer, it is in the habit of leaving its runs, and wandering during great part of the night, on the surface of the land, in search of its food. My friend Mr. Yarrell informs me that he has now and then, when shooting, surprised a Mole above ground, which his pointers have stood as if it were fair game.

In addition to all the accomplishments and arts which we have assigned to our Mole, it possesses that of being an expert swimmer; an action for which the structure both of the hands and of the hinder feet are well adapted. Surprised in its encampment by the floods of autumn, it seeks its safety by this means; and a friend of mine, residing at Waltham Abbey, assures me that he has seen Moles swimming very featly, when the marshes of that neighbourhood have been inundated. But it is not only when driven to it as a means of escape from danger that it employs this mode of travelling: it will not hesitate to cross a brook, or even a broad river, in order to change its hunting-ground, or to emigrate from a district which has ceased to yield it sufficient nourishment; and occasionally, it would appear to take the water, merely for the purpose of enjoying the luxury of a bath.

The Mole, like all other voracious animal-feeders, requires to drink frequently. Hence, where there is a colony of Moles using the same high road, a run is always made towards the nearest ditch or pond: and when this cannot conveniently be reached, we have Mr. Jackson's authority for stating, that the animal sinks deep perpendicular shafts, at the bottom of which water is always found, to which the Mole has easy access. Sometimes, according also to the observations of Mr. Jackson, these wells are full to the brim.

If, in the foregoing account of those habits of the Mole which have reference to the preservation of its individual existence, we have been struck with the ardour and perseverance of its character,—with the fierceness and voracity of its hunger, and the laborious and indefatigable toil employed to satisfy that appetite, it is found to exhibit equal violence in the ardour of the sexual passion, and equal pertinacity and boldness in its pursuit. The tracks by which the male pursues his mate are numerous and curiously divaricating: they are very superficial, and are made with great rapidity. They are termed by the French naturalists "*traces d'amour*;" and by our English Mole-catchers, "coupling runs," or "rutting angles." As the males are much more numerous than the females, it often happens that several of the former sex are in pursuit of one of the latter; in which case bloody and even fatal battles ensue between the rivals, which fight on the surface of the ground, and the victorious male is left in undisturbed possession.—The attachment of the male to his mate would appear to be very powerful, though probably but short-lived. Le Court several times found a female taken in his trap, and the male lying dead close to her. Whether this may have occurred from starvation, the force of sexual attachment having been strong enough to overcome that of hunger, it is perhaps difficult to prove: but when it is

recollected how short a fast proves fatal to this animal, it is not perhaps an improbable explanation of this curious fact.

De Vaux seems inclined, in his antipathy to the Mole, to deny to it the possession of a single quality, that bears the slightest analogy to any trait of character which we are accustomed to consider amiable or virtuous. If, however, we may believe the statement of one who declares himself to have been an eye-witness of the following fact, it is impossible not to accord to it the strongest conjugal and parental attachment. In the work so often quoted, is inserted a letter from a person who professes himself the advocate of this ill-fated animal, and who affirms that when a sudden flood reaches its nest, the male and female are seen braving in company the dangers which threaten them, and exposing their own lives to the utmost hazard in order to save their young; in which office of affection they mutually assist and protect each other.

The nest is always distinct, and frequently remote from the fortress, and is usually, but not always, covered by a hillock; which, when it exists, is much larger than an ordinary mole-hill. It is formed simply by excavating and enlarging the point of intersection of three or four passages. The bed of the nest is composed of a mass of herbage, grass, roots, or leaves: in one which was examined by Geoffroy and Le Court, no less than two hundred and four blades of young wheat were counted. This, however, can scarcely be considered as an ordinary occurrence, as they generally prefer dry and soft substances. The period of gestation is supposed to be about two months or upwards; and the young are brought forth in April,—sometimes earlier, at others later, according to the season: indeed young Moles have been found at all times from the beginning of April till August,

which has led some persons to believe that there are more than one brood in the year. There are generally four or five, sometimes as few as three, rarely six ; and an instance is recorded in the eighth volume of Loudon's Magazine of Natural History, in which seven were found in one nest. The period of lactation is not accurately known, but is supposed to continue till the young are about half-grown. The prevalence of the number of males over that of females, and the occurrence of but a single brood in a year, are circumstances which tend greatly to circumscribe the increase of the species.

The Mole has always been the object of the most determined persecution on the part of the farmer and the gardener, from the notion that it occasions a degree of injury, more or less serious, to various products of the soil. This absolute proscription of a whole species can only be justified, if it can be justified at all, by the certainty that its devastations are so extensive, as to inflict severe loss and damage upon mankind, in this his primeval and most important occupation ; and it will not be an unreasonable or useless employment to endeavour to place the subject in its true light, and to ascertain as nearly as possible to what extent this character of an universal depredator is deserved. In order to arrive at a true solution of this question, it is necessary to divest our minds as well of the prepossessions of the naturalist as of the prejudices of the agriculturist ; for we shall probably find, as in most other cases, that the truth lies between the two extremes. According to its accusers, there is no portion of its labours, no peculiarity of its habits, no function of its organization, that is not the means or the cause of ravage and devastation to our cultivated grounds. The soil, say they, is rendered dry and sterile by its subterranean roads ; the crops are killed by the exposure or the destruction of the roots ;

the plants themselves are overthrown by the construction of the mole-hills, or they perish from their roots being eaten, or they are dug up and scattered by the superficial furrows which the animal ploughs up, either in search of food or in pursuit of its mate: large quantities of young corn too are carried off by it to form its nest; and, finally, its abandoned fortress becomes the resort of the Field Mouse and other noxious animals. Thus the field and the meadow, the garden and the plantation, are alike the scenes of its ravages; and De Vaux calculates that the loss which it occasions to the spring corn alone may be calculated at one-eighth of the whole produce. Then, on the other hand, these prejudiced judges allow nothing for the benefit which arises from the destruction of innumerable worms, and of insects both in the larva and perfect state: this advantage is in fact denied by De Vaux, who declares that the Mole feeds only on the most harmless of these animals, the earthworm, and that it refuses those which are injurious to mankind. Its more benevolent advocates, on the other hand, contend not only that the injury which it perpetrates is slight, but that it is more than counterbalanced by the benefit which it produces by turning up and lightening the soil, and especially by its immense destruction of earthworms, and many other noxious animals which inhabit the superficial layer of the ground, and occasion great injury to the roots of grass, corn, and many other plants. If we examine the real nature and degree of its injuries on the one side, and its utility on the other, we shall probably find that both parties are erroneous. The fact of its devastations cannot be denied—it is only in the degree and extent of them that the estimation is incorrect; and whilst its utility in clearing the ground of worms and similar causes of injury must also be allowed, it can scarcely be sustained that the lightening of the soil by the turning up of its

hillocks is, at most, more than a very equivocal source of advantage.

Instances are not wanting of inundations produced by the burrowing of Moles through dams and dykes ; but it would be too much to wage war with a whole race, for an accidental transgression of this kind by a few individuals. Nor is it much to the purpose to urge the indirect injury which the Mole produces, by forming habitations for different species of Field Mice, which often succeed to its deserted excavations. It is true that the new occupants are thus saved the labour of forming their own retreats ; but this cannot materially influence their number, for it is only by the quantity of nourishment which they are able to procure, that the increase of these little Malthusians is limited.

Be this as it may, however, the opinion is generally so strong against this active and unceasing labourer, that thousands are annually destroyed, and a considerable income is received by a good Mole-catcher in the course of a season, at a trifling sum given for each captured Mole. Mr. Jackson, to whom I have already alluded, and who appears to be a very intelligent person, and particularly successful in his business, states that he had been a Mole-catcher for thirty-five years, during which time he had destroyed from forty to fifty thousand of these animals. Mr. Couch, whose name is so well known as a zealous naturalist, and of whom such frequent mention is made by Mr. Yarrell, in his work on British Fishes, states that a Mole-catcher in Cornwall took no less than twelve hundred Moles in six winter months. But all others must yield to Le Court, who, in the short space of five months, took no less than six thousand Moles, within a comparatively small district ; and two of his pupils, during the month that they were under his instructions, killed nine hundred and seventy-one. It really seemed as if it were im-

possible that a Mole could escape this extraordinary person : wherever he struck his hoe, he found the Mole's run ; wherever he placed his trap, the Mole was surely taken. His trap was of a very simple construction. It consisted of a steel instrument of two branches, formed somewhat like a pair of sugar-tongs, excepting that the branches crossed each other about their mid-length ; so that the elasticity of the bend brought the extremities forcibly outwards, and towards each other : the branches were held asunder by a square piece of iron with a hole through it, which the slightest touch would displace ; and the Mole, running along its passage, threw the trigger, as it may be called, and was caught by the branches springing sharply together. This appears to be a very simple, certain, and effectual instrument ; but it is considerably improved upon in one now much employed in this country, in which the hinge, connecting the two branches, is placed in the middle, the spring behind, and the trigger before the hinge. A sort of box-trap has been recommended in some places ; but it has the defect of being less certain, and at the same time it is not free from the objection of cruelty ; as the Moles are taken alive, and when several are confined in the trap together, they fight in the most desperate manner, wounding and even destroying each other.

The Mole is not found in the northern extremity of Scotland, nor in the islands of Orkney and Zetland. It has never been seen in any part of Ireland ;—a circumstance which has been attempted to be accounted for, by some, by the nature of the climate and the soil. This, however, is not an equivalent cause ; as it is found in every kind of soil throughout England and the Continent of Europe. It is, perhaps, rather dependant upon its extreme intolerance of fasting, and the slight degree of violence which is sufficient

to destroy its life ;—circumstances which would render its casual migration to that country next to impossible.

The ancients in general appear to have had but vague notions respecting the habits and structure of animals: from this charge the great father of natural science is in an astonishing degree exempt. It has, however, been adduced as an instance of erroneous and superficial observation, that Aristotle held the Mole to be absolutely blind. I have already suggested that this probably arose from his having principally examined the species now called *Talpa caeca*, in which the eyelids are closed, whilst in the common species they are open. There is likewise a distinction in the character of the incisive teeth, which in the common Mole are all equal, whilst in the other the middle ones are longer than the others; and De Vaux states that there are also some slight differences in their habits and architecture. As they are both equally inhabitants of Europe, I have thought it better to drop the original trivial name *Europæa*, and to adopt that of Brisson, *vulgaris*, which is not liable to the same objection as the former. They are both exceedingly well figured by the Prince of Musignano in his beautiful *Iconografia della Fauna Italica*.

There are several remarkable varieties of the present species: it is found of a deep black colour, of a mouse-grey, pied, yellowish white, and wholly or partially orange. It has been supposed that some of these differences of colour are connected with soil or climate; but there appears to be but little ground for such an opinion.

The ancient English name of the Mole is Mouldwarp or Mouldiwarp, from the Anglo-Saxon ‘*Molde*,’ soil, and ‘*Weorpan*,’ to throw or turn up. This is still its common name in many parts of England, particularly in the North.

Gascoigne, who wrote in the sixteenth century, employs indifferently Mowle and Mouldiwarpe; Spenser uses Moldwarp; and Shakspeare has Mole, as it is now spelt: thus in the first edition of Hamlet, printed in 1603—

“ Well said old Mole, canst work in the earth
So fast? a worthy pioner!”

In Dorsetshire, Devonshire, and other parts of the West of England, it is always called Want: a name probably introduced by the Danes; ‘Wand’ being the old Danish, and ‘Vond’ still the Norwegian name for this animal.

The body of the Mole is thick and full, oblong, nearly cylindrical, not ordinarily raised above the ground: head tapering to the extremity of the nose, which is formed for turning up the earth. The teeth sharp-pointed, the incisors very small, the canines long and very acute; the false molars like the canines, but much smaller; and the true molars broad, and having many sharp conical elevations. Eyes extremely small, black, situate in the middle of a circular naked space of about a line and a half or two lines in diameter: eyelids open to a very small extent. Ears without any external conch. Anterior feet very robust, formed for digging; the palms turned outwards, the fingers short, the terminal phalanx being as large as all the others; wrist concealed in the fur. Tail scaly, and furnished also with long stiff hairs. Fur very soft, silky, and short, inserted perpendicularly to the surface of the skin; shining like velvet, showing different tints according to the direction in which it is viewed; bright grey when seen in the direction in which the hairs lie, and rich deep black in the opposite one: a slight yellowish tinge appears on the lower jaw, and along the middle of the belly.

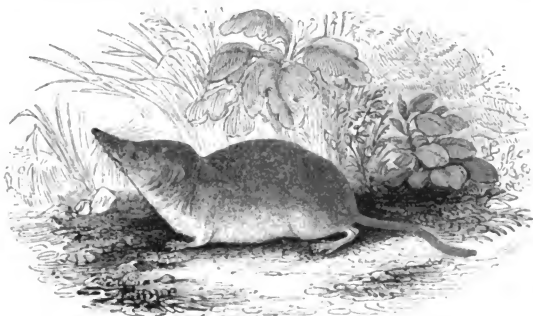
Dimensions :—

					Inch.	Lines.
Length of the head and body	.	.	.	.	5	2
„ of the head	.	.	.	.	1	7
„ of the tail	.	.	.	.	1	2

Dentition :—

$$I. \frac{2}{2} : C. \frac{2}{2} : F. M. \frac{2}{2} : M. \frac{2}{2} = \frac{22}{22}.$$



Genus, *Sorex*.

SHREW.

Generic Character.—Incisors much produced ; the upper ones curved and notched at the base, the lower ones almost horizontal ; no canines : false grinders $\frac{3}{2}$; true grinders $\frac{3}{2}$. Fur short, soft, and silky : snout attenuated ; tail long ; feet all formed for running.

COMMON SHREW.

SHREW MOUSE

Sorex araneus. (Linn.)

Specific Character.—Reddish mouse-colour above, paler beneath ; tail somewhat quadrangular, rather shorter than the body, not ciliated beneath.

- Sorex araneus*, LINN. Faun. Suec. II. p. 9, 24.—Syst. Nat. I. p. 74. GEOFFR. Ann. Mus. XVII. p. 174, t. ii. f. 2. DESMAR. Mammal. p. 149. FLEM. Brit. An. p. 8. JENYNS, Brit. Vert. p. 17.
Musaraigne, DAUBENT. Mem. Acad. 1756, p. 211, t. v. f. 2. BUFFON, Hist. Nat. VIII. p. 57, t. x. f. 1.
Erdshrew, MERRETT, PINAX, p. 157.
Common Shrew, SHAW, Gen. Zool. I. p. 527, t. cxviii.
Fetid Shrew, PENN. Brit. Zool. I. p. 125.

I HAVE ventured, after some consideration, to retain the name *araneus* for the Common Shrew of England, notwithstanding the doubts which have existed in the minds of many Zoologists, and in which I had till lately participated. Thees

doubts have arisen from what I believe to be an erroneous statement of Geoffroy, who, in his paper on the Shrews, in the *Annales du Muséum*, has given as a character of *Sorex araneus*, that the teeth are all white ; and as Daubenton, in his memoir on the same subject in the *Mémoires de l'Académie des Sciences*, does not mention the colour of the teeth at all, the authority of Geoffroy has been sufficient to produce considerable hesitation whether the *Sorex araneus* of the Continental authors be identical with our Common Shrew, which has invariably brown teeth.

It seems, however, to have been overlooked, that Daubenton, in his description of the Shrews in Buffon's *Histoire Naturelle*, has set the question at rest as far as it regards the colour of the teeth ; for in describing the " Musaraigne " — *Sorex araneus*, he refers, for the account of the teeth, to his description of the " Musaraigne d'eau " — *S. fodiens* ; and we there find that the teeth of the " Musaraigne " are brown at the tips. Now, as he invariably speaks of this species without any adjunct to the name, in contradistinction to the Water Shrew, there can be no doubt, as far as this character is concerned, that the Continental and British animals may be identical ; and there appears to be no reason, from any other characters, to doubt that such is the case. That more than one species have been confounded amongst the Common Shrews of this country, I have long entertained a decided prepossession ; but I have not at present sufficient ground to warrant me in describing them as distinct.

The Common Shrew frequents dry situations, feeding upon insects and worms, in the pursuit of which its attenuated snout enables it to grub amongst the closest herbage, or under the surface of the soil ; for which habits it is also adapted by its soft, short, velvety coat, and its extensible form. Like the Mole and other insectivorous tribes, it is very impatient of hunger during the summer : like that ani-

mal, too, it is excessively pugnacious, so that it is rare to see two of them together excepting in the act of fighting. If two Shrews be confined in a box together, a very short time elapses before the weaker is killed and partly devoured. They not only destroy each other, but there is reason to believe that many of them are victims to the voracity of the Mole. My friend Mr. Joseph Clark, of Waltham Abbey, informs me that in a field which has always before been abundantly inhabited by Shrews, scarcely one has been seen during the present season ; but that a colony of Moles has occupied the district, to whose voracity he, with much probability, attributes the disappearance of the Shrews.

It has often been stated that Owls, like Cats, will kill but not eat the Shrew ; and this opinion has received some plausible support from the circumstance that Shrews are not uncommonly found dead, with the loins pinched as if by the beak of some rapacious bird. The following fact, however, shows that this notion is altogether erroneous. Mr. Turner, of the Botanic Garden at Bury St. Edmunds,* on examining twenty pellets or casts of the barn owl, taken promiscuously from a mass of them, covering to the depth of several inches the floor of an ancient retreat of a pair of those birds, found amongst them the skeletons of no less than seven Shrews. There appears to be more truth in the assertion of Pennant, and many other writers, that " Cats will kill, but not eat the Common Shrew ;" and this aversion may probably arise from the rank, musky smell which this species possesses, and which may also have been in some measure the cause of the ancient prejudice concerning its supposed power of inflicting injury by the mere contact of its body. Thus, in Edward Philips's " World of Words," it is stated that the Shrew Mouse is " a kind of Field Mouse of the bigness of a Rat and colour of a Weasel, very mischievous to cattel ;

* Loudon's Mag. Nat. Hist. vol. v. p. 727.

which going over a beast's back, will make it lame in the chine; and the bite of it causes the beast to swell at the heart and die."

The superstitions of olden times are now fast fading from among us, like the ignited vapours of unwholesome bogs before the approach of day. The time can scarcely be far distant when even the existence of those which now remain will be matter of mere tradition, and offer many a subject of curious investigation to the antiquaries of succeeding ages; and many animals which, like the Shrew and the Hedgehog, are now the dread of the ignorant, and are destroyed from mistaken notions of their being directly or indirectly injurious to mankind, will be suffered to live on, and fulfil the beneficial offices which some of them at least confer upon us, by the destruction of creatures more noxious than themselves. The prejudices just alluded to, however, are still rife in many parts of the country; and the Shrew is yet believed to produce lameness by running over the foot, and disease to any part of an animal by the same means. The use of the ancient antidote to these imagined injuries has now probably passed away: it consisted in the application of a twig of a Shrew-ash, of the preparation of which Gilbert White gives the following amusing account.

"At the south corner of the plestor, or area, near the church, there stood, about twenty years ago, a very old, grotesque, hollow pollard-ash, which for ages had been looked upon with no small veneration as a Shrew-ash. Now, a Shrew-ash is an ash whose twigs or branches, when applied to the limbs of cattle, will immediately relieve the pains which a beast suffers from the running of a Shrew Mouse over the part affected; for it is supposed that a Shrew Mouse is of so baneful and deleterious a nature, that wherever it creeps over a beast, be it horse, cow, or sheep, the suffer-

ing animal is afflicted with cruel anguish, and threatened with the loss of the use of the limb. Against this accident, to which they were continually liable, our provident forefathers always kept a Shrew-ash at hand, which, when once medicated, would maintain its virtue for ever. A Shrew-ash was made thus :—into the body of the tree a deep hole was bored with an auger, and a poor devoted Shrew Mouse was thrust in alive, and plugged in, no doubt with several quaint incantations long since forgotten.” * Another method of cure was to make the person or animal pass through the arch of a bramble, both ends of which were rooted and growing.

The female Shrew brings forth in the spring from five to seven young ones. The nest, which consists of soft herbage, is made in any hole or depression on the ground, or in a bank : it is covered over at the top, and is entered at the side. The increase of the species which such a numerous progeny would be calculated to produce, is counterbalanced, not only by the destruction which takes place amongst them through the agency of other animals, as Moles, Weasels, and Owls, but by a very general mortality which prevails early in autumn, the cause of which does not appear to be understood. It is common at that season to find numbers of them lying dead in the fields and hedge-rows, without any apparent external injury.

For the following etymological observations on the word Shrew, I am indebted to my learned friend Mr. Thompson of the London Institution.

“ *ſcneapa* (*Schreava*, Angl. Sax.) ‘A Shrew Mouse ; which, by biting cattle, it venometh them that they die.’—(Somner.) Lye adds the orthography of *Schreova*. The etymon may possibly be found in *Schreadan*, to cut, or *Schrif*, to censure bitterly ; or rather *Scheorſian*, to bite

* White’s Selbourne, pt. II. xxviii.

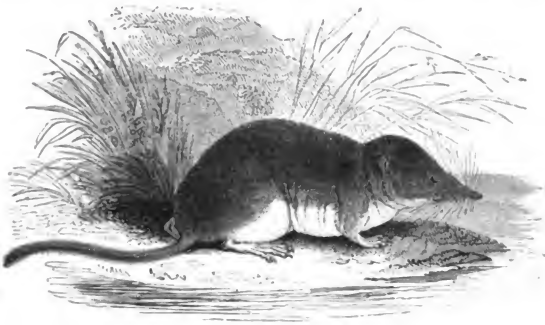
or gnaw, (all Angl. Sax.) and the ordinary notion is that the biting disposition, expressed by the word Shrew, comes from the name of the Shrew Mouse ; though Todd prefers deriving it from the German *Schreive*, to clamour, or from the Saxon *Schyrvan*, to beguile. In the word Erdshrew the prefix is clearly the Anglo-Saxon *eopð*, *Eorth*, earth—designed to express the animal's habitation."

This species varies considerably in size as well as in colours. It is usually of a reddish mouse colour above, greyish beneath ; but the brown of the upper part is more or less red in different individuals, and the grey colour of the belly darker or lighter, and more or less tinged with yellow. Snout much attenuated ; ears small, rounded, scarcely visible above the fur, with two internal lobes, which are fringed with whitish hair ; the anterior teeth of a rich brown colour.* The body shortened, and the back elevated when at rest, but susceptible of considerable extension when running : tail always shorter than the body, though somewhat varying in proportional length ; four-sided, with the angles rounded ; of nearly equal size throughout, not attenuated at the extremity ; furnished everywhere with short, close, rather stiff hairs, but not ciliated on the under surface : hinder feet narrow, not ciliated.

It sometimes occurs spotted with white ; and I have a skin, given to me by my friend Henry Brodribb, Esq. of Salisbury, which is beautifully pied, having a broad white band over the loins, which extends all round the animal. This specimen was taken near Amesbury in Wiltshire.

Dimensions :—

	Inch.	Lines.
Length of the head and body	2	7
„ of the head	1	1
„ of the tail	1	10
„ of the ears	0	2



WATER SHREW.

Sorex fodiens. (Pall.)

Specific Character.—Nearly black above, white beneath, the colours distinctly separated; tail two-thirds the length of the body; feet and tail ciliated with strong white hairs.

Sorex fodiens, (PALLAS.) SCHREB. Säugth. p. 571. LINN. Syst. Nat. ed. GMEL. I. p. 113. FLEM. Brit. An. p. 8. JENYNS, Brit. Vert. p. 18.

„ *Daubentonii*, GEOFF. ADD. Mus. XVII. p. 176. FR. CUVIER, in Dict. des Sc. Nat. XXXIII. p. 425. DESMAR. Mammal. p. 150.

„ *bicolor*, SHAW, Nat. Misc. t. lv.

Musaraigned'eau, DAUBENT. Mém. Acad. des Sc. 1756, p. 211. BUFFON, Hist. Nat. VIII. p. 64, t. xi. f. 1.

Water Shrew, PENNANT, Brit. Zool. I. p. 125, t. ii.

THE habits of this beautiful little creature are clearly indicated by the peculiarities of its structure. Possessing the same general conformation as the former species,—the same soft, short, silky coat—a body similarly gracile, and a snout almost equally attenuated,—the addition of stiff cilia to the sides of the toes, and the greater breadth of the feet, together with the fringe of hairs on the under surface of the

tail, show that its ordinary pursuits require the use of oars and rudder ; and that while, like all the other species of the genus, its food consists of insects, it is in the water that this food is to be obtained.

The observations of several intelligent naturalists have not only confirmed this conclusion, but have afforded many curious details as to its mode of life ; and we find that its habits are no less interesting, than its form and movements are elegant and pleasing.

According to the account given of one of them by Mr. Dovaston,* to whom we are indebted for the first as well as the most detailed description of its manners, "it dived and swam with great agility and freedom, repeatedly gliding from the bank under water, and disappearing under the mass of leaves at the bottom, doubtless in search of its insect food. It very shortly returned and entered the bank, occasionally putting its long sharp nose out of the water, and paddling close to the edge. This it repeated at frequent intervals from place to place, seldom going more than two yards from the side, and always returning in about half a minute. Sometimes it would run a little on the surface, and sometimes timidly and hastily come ashore, but with the greatest caution, and instantly plunge in again." Its swimming is principally effected by the alternate action of the hinder feet, which produces an unequal or wriggling motion : it makes its way, however, with great velocity ; and as it swims rather superficially, with the belly flattened, the sides as it were spread out, and the tail extended backwards as a rudder, it forms a very beautiful and pleasing object, moving on the calm surface of a quiet brook, or diving, in an instant, after its food, its black velvety coat becoming beautifully silvered, with the innumerable bubbles of air that cover it when submerged ; and on rising again, the fur is observed to be per-

* Loud. Mag. II. p. 219.

fectly dry, repelling the water as completely as the feathers of water-fowl. It is attacked by the Weasel, which will even follow it into the water, where, however, it readily saves itself by diving. It burrows under the margin of the bank ; —a safe and commodious habitation, from which it can, at the first alarm, throw itself into the water, and elude pursuit.

It is often found at some distance from the water. There can be no doubt that it occasionally seeks its food on the land, probably when it has exhausted the ditch or brook to which it has attached itself ; for it appears, from Mr. Dovaston's account, to remain for a long season the denizen of one chosen spot, where it pairs, and probably rears its offspring.

The female, which is said to be a little smaller than the male, and not so dark-coloured, produces from five to seven or eight young. Some assert that nine is the ordinary number ; but I have reason to believe that it rarely exceeds six or seven.

It is remarkable that so beautiful and interesting an animal should for a long time have been so entirely unknown or neglected by the naturalists of this country, especially when it is considered that its presumed rarity can only be attributed to the want of observation ; as numerous localities have been ascertained since Mr. Dovaston recalled our attention to it. In Scotland—in several of the northern, midland, and southern counties of England, it has now been ascertained to exist : I have received it from Essex,* from Hertfordshire, and from Devonshire ; and in neither of these counties can it be considered as a rare species. The black and silky fur of the upper part, and its elongated snout, have given rise to the opinion in some places that it was a small species of Mole ; to which both the structure and habits of the whole genus indicate a very near affinity.

* On the river Lea, by Waltham Abbey, near the spot from which the subject of the vignette is taken.

The snout of this species is less attenuated than that of the Common Shrew, and somewhat depressed; eyes very small; ears very short, furnished with three internal lobes, one of them fringed with white hair, which, reaching to the surface of the fur, indicates the situation of the ear by a small white spot: anterior teeth ferruginous at the tips; body broader and more full than in *S. araneus*; tail rather slender, quadrangular, compressed at the tip, fringed with stiff hairs beneath; feet rather broader than in the former species, formed for swimming, having a lash of stiff white hairs on the edge of the toes: fur short, soft, and silky. The colour of the upper parts, including the head, back, flanks, and outer surface of the fore and hind legs, a rich brownish black; the under parts nearly pure white, the line of demarcation between the two colours being abrupt; a dusky spot around the pubis.

In some specimens the colour of the upper parts is of a dark reddish brown. Dimensions:—

	Inch.	Lines.
Length of the head and body	3	3
„ of the head	1	0
„ of the tail	2	1





OARED SHREW.

Sorex remifer. (Geoff.)

Specific Character.—Tail quadrangular, compressed towards the apex, ciliated on the under surface; feet strongly ciliated: body black above, greyish black beneath; throat yellowish ash colour.

- Sorex remifer*, GEOFF. ANN. MUS. XVII. p. 182, t. ii. f. 1. DESMAR. Mammal. p. 152. FR. CUVIER, Dict. des Sc. Nat. XXXIII. p. 426. JENYNS, Brit. Vert. p. 18.
 „ *ciliatus*, SOWERBY, Brit. Miscell. t. xlix.
Oared Shrew, YARRELL, Loud. Mag. Nat. Hist. V. p. 598. — Proceed. Com. Sc. Zool. Soc. 1832, p. 109.

THE OARED SHREW, the largest of our indigenous species, was first published as British by Mr. Sowerby, in his British Miscellany, under the name of *Sorex ciliatus*, from an individual taken by Dr. Hooker in Norfolk. A specimen having, however, come into the possession of my friend Mr. Yarrell, he concluded upon careful examination, and a comparison not only with Geoffroy's description, but with a specimen of *Sorex remifer* from Abbeville, now in the British Museum, that it must be referred to that species; in

which opinion I am quite disposed to concur, notwithstanding some difference in point of size—a character in which all our species of *Sorex* are very liable to vary. Since the capture of Mr. Yarrell's specimen, which occurred in Battersea-fields, that gentleman has obtained a second; and Mr. Jenyns also possesses one which was taken in Cambridgeshire. In Loudon's Magazine of Natural History, a work replete with the most varied and interesting information on all the sciences which its object embraces, Dr. Scougel of Glasgow states that the Oared Shrew is not uncommon in the neighbourhood of that city, and that he had obtained three specimens from different localities, which Dr. Hooker "at once recognised as being in every respect similar to the Water Shrew which he had procured in Norfolk." It appears then that this species, so recently discovered to be indigenous to this country, is far from being restricted to any particular locality; and it is more than probable that, like *S. fodiens*, it will, now that the attention of our naturalists is drawn to it, prove to be still more generally distributed.

The structure of the Oared Shrew shows at once that its habits are more or less aquatic; yet, as we find to be the case with the *S. fodiens*, it is met with at a distance from water, as were Mr. Jenyns's specimen and the three obtained by Dr. Scougel. The others were taken in ditches. Of its peculiar habits we know nothing.

The snout in this species is flattened, and less attenuated than that of the Common, or even of the Water Shrew, and the body is thicker; the ears are fringed with a tuft of white hairs; the teeth, as in the other species, are ferruginous at the tips. The tail is somewhat quadrangular for about two-thirds its length, the remaining third being compressed; its under surface is ciliated with strong stiffish grey or whitish hairs; the feet are also strongly ciliated, and, like those of

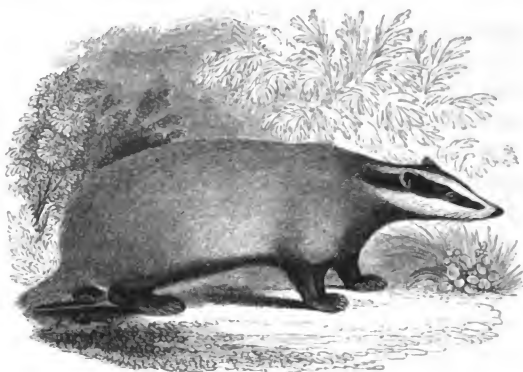
S. fodiens, broader than in the Common or Land Shrew. The colour of the whole of the upper part and sides of the body is black, with here and there a single white hair, and a white spot on the ears; which, however, Mr. Jenyns states, is not always the case: under parts greyish black; the breast and middle of the abdomen with a yellowish tinge, which is brighter and more distinct on the throat; feet and tail dusky, whitish beneath. Dimensions:—*

	Inch.	Lines.
Length of the head and body	3	2
„ of the head	1	0
„ of the ears	0	2
„ of the tail	2	1
„ of the fore-foot	0	5
„ of the hind-foot	0	8½

The vignette consists of a view of the under surface of the hinder foot, in each of our indigenous species of Shrew; the left-hand figure being that of the Common, the middle that of the Water, and the right-hand that of the Oared Shrew.

* See Mr. Jenyns's description, Brit. Vert. p. 18.





Genus, *Meles*. (Cuv.)

BADGER.

Generic Character.—Second incisive tooth in the lower jaw placed behind the others; grinders $\frac{3}{4}$, in an uninterrupted series: feet plantigrade; a glandular pouch underneath the tail, having a transverse orifice.

THE BADGER.

BROCK. GREY. BAWSENED-PATE.

Meles taxus.

Ursus meles, LINNÆUS, Syst. Nat.

Meles vulgaris, DESMAR. Mammal. p. 173, sp. 266.

„ *taxus*, FLEM. Brit. An. p. 9. JENYNS, Brit. Vert. p. 10.

Le Blaireau, BUFFON, Hist. Nat. VII. p. 104, t. vii.

The Badger, PENN. Brit. Zool. I. p. 85, t. viii.

SINCE the extirpation of the Bear, *Ursus arctos*, of the existence of which mention is made in Scottish history as late as in the year 1073, the family of the *Ursidæ** has had

* The Bear tribe.

no other representative, in our indigenous zoology, than the present animal, which in its habits, no less than in its structure, claims no very remote relationship to that tribe.

Heavy, sleepy, and slothful—endowed with but a moderate degree of intellect, and with instincts dull and obtuse, it yet possesses a character and qualities which, if not peculiarly interesting and intelligent, are far from being disgusting and ferocious ; and if it do not boast the admirable sagacity and lively attachment of the Dog, it is yet free from the cunning and rapine of the Fox, and the fierceness and treachery of the Cat. Its favourite haunts are obscure and gloomy ; it retires to the deepest recesses of woods, or to thick coppices covering the sides of hills ; and there, with its long and powerful claws, digs for itself a deep and well-formed domicile, consisting of more than one apartment, the single entrance to which is by a deep, oblique, and even tortuous excavation. The general form of the elongated but robust body—the long, taper muzzle, terminating in a movable snout—the hard, coarse hair—the loose and leathery skin, the low and plantigrade limbs, and the fossorial character of the claws, combine to fit the Badger for a subterranean abode, and to enable it to form that abode by its own labour. Here it sleeps during the greater part of the day, coming abroad only for a short period in the evening or night, to seek its sustenance, in the choice of which it exhibits as completely an omnivorous a character as perhaps any animal with which we are acquainted. Its food, in fact, consists indifferently of various roots, earth-nuts, beech-mast, fruits, the eggs of birds, some of the smaller quadrupeds, frogs and insects. Buffon states that it digs up wasps' nests for the sake of the honey ;—a fact which has received an interesting confirmation from the observation of a correspondent of Loudon's Magazine of Natural History, who seems however

to attribute the destruction of these nests to the fondness of the Badger for the larvæ of the wasp, as he says that the combs were found scattered about, but none were left that contained the maggots. This predilection of the Badger for honey offers a striking analogy to several others of the group, particularly to its Oriental relation the Ratel, *Mellivora Capensis*, which is known to live principally upon it.

The Badger is endowed with astonishing strength of jaws, which is aided by the peculiar manner in which the lower is articulated with the upper, the condyle being received deeply into the glenoid cavity, which bends over it, before and behind, so as to retain it permanently in its place. It also possesses great general muscular power; and these means of inflicting injury, combined with the defensive coat of mail afforded by its strong leathery hide, and rough, long, shaggy hair, render him a formidable enemy, to attack or to cope with. Such qualities as these formerly occasioned the cowardly and barbarous amusement of Badger-baiting, now probably but little known, to be a favourite and exciting sport amongst our rustic population. The poor devoted Badger was put into a small tub or barrel, or some such place of partial protection, and there baited by numerous Dogs, collected without much regard to breed, though the Rough Terriers were the favourites; and it would be difficult to say whether the cruelty were greater to the persecuted Badger, or to his canine tormentors.

The gradual cessation of these barbarous and dastardly sports is indeed one of the necessary results of the spread of education, which, at once, produces a taste for the substitution of intellectual for mere animal sources of enjoyment, and supplies the means for its indulgence; but there is, in the present instance, another cause for the decline of this amusement, perhaps as efficient as the former,—which is, the nu-

merical decrease of the species itself: and were it not for this, it is to be feared that a humane interposition to save an unhappy Badger from this tormenting persecution, might still chance, in some places at least, to be met with honest Dandie Dinmont's astonished exclamation, "Lord save us,—to care about a Brock!" The recollection of the custom, however, will continue to be interesting to the philologist when the custom itself shall long have passed away, as having given rise to a common expression, which will probably be perpetuated as part and parcel of our language. A person who is beset by numerous assailants is said to be "badgered."

The Badger is taken in various ways. The favourite mode, and that which is perhaps the most successful, is by catching him in a sack placed at the entrance of his hole. The haunt of a Badger being ascertained, a moonlight night is chosen, when he is out feeding, and a small sack is placed within the mouth of the hole, fastened at the outside, with the mouth of the bag outwards, and having a running string round it. Two or three couples of hounds are then thrown off at some distance; and as soon as the Badger hears their cry, he makes for his home with all speed, and runs into the sack, which closes behind him by the tightening of the running string at its mouth. Another method is by digging him out. This however is laborious, and not always successful, particularly in sandy soils, in which the Badger will easily foil the Dogs which pursue him in his subterranean passage, by throwing the earth back upon them and blocking up their way, whilst he takes advantage of their loss of time and makes his way to the surface.

If taken young, the Badger may be easily and completely tamed. I had one for a considerable time, which was sent to me by my valued old friend James Buckland, Esq. of

Shaftesbury, who had obtained it from a cottager in the neighbourhood, whose children Mr. Buckland accidentally saw playing with the Badger, as familiarly as they would with a puppy. He found that the animal had been taken when very young, and had been brought up as the playmate of the children: it had, however, become rather too rough in its fondness, and the poor man was willing to part with it. It thus came into my possession, and soon became a great favourite, showing too, on its part, great attachment to me and to the household. It followed me like a Dog, yelping and barking with a peculiar, sharp cry, when he found himself shut out of the room in which I happened to be sitting. He was accustomed to come into the dining-room during dinner, of which he was generally permitted to partake, and he always ate his morsels in a very orderly manner. He was in fact an affectionate, gentle, good-tempered fellow, and very cleanly withal. He died of the disease which destroys so many carnivorous animals when in a state of confinement;—a stricture of the pyloric opening of the stomach, by which the passage of the food into the intestine is gradually interrupted, and ultimately closed.

The male and female Badger are rarely seen in company. It is probable that the sexes are directed to each other by scent, and that the fetid secretion from the glandular pouch under the tail, is intended in this, as in many other instances, to afford them traces of each other. The female brings forth her young in the summer, to the number of three or four in a litter. Her nest is formed of moss and grass, and is prepared beforehand for the reception of the young.

The Badger is still found in many parts of England and Scotland, and is also a native of almost every country in Europe: it is, however, nowhere very common, and in some places has become a rare animal. Aristotle does not even

allude to it. It was known to the ancients, for Pliny speaks of it, though but cursorily.

The word Badger is of very uncertain origin. Skinner derives it from the Teutonic 'Back,' the jaw, *quasi* 'Backer,' on account of the great strength of that part in this animal. The Anglo-Saxon 'Broc,' is still retained in Scotland, and in the northern counties of England: it is also termed 'Grey,' and 'Bawsened-pate;' the word Bawsened meaning striped with white.

The body is robust, though somewhat elongated; the legs are short, and the body consequently low; but it appears more so than it really is, in consequence of the length of the hair on the belly, which even reaches to the ground. The head is taper, and the muzzle produced; the ears small and rounded, and nearly hidden in the long hair of the sides of the head; the eyes small; the tongue smooth; the number of the grinding teeth is variously stated by different naturalists as being $\frac{4}{3}:\frac{4}{3}$, $\frac{4}{3}:\frac{4}{3}$, $\frac{5}{3}:\frac{5}{3}$, or $\frac{4}{3}:\frac{5}{3}$, according as a small rudimentary false molar exists or is wanting, immediately behind the canine above or below. In a cranium in my possession it is wanting in both jaws; and, on the contrary, Desmarest gives the highest number, from a specimen in which it existed in both; whilst in Frederic Cuvier's figure and description it is wanting in the upper and exists in the lower. The second incisive tooth in the lower jaw is placed behind the other two.

The back is rounded. The tail very short, not extending further than the middle of the hinder legs. Feet hairy, particularly the hinder ones, with five toes on each, armed with strong, curved, fossorial claws. Hair of the body long, loose, and of three colours, white, black, and reddish, the union of which produces a rich grey, which varies in tint in different parts. Head white, excepting a band of black,

commencing between the nose and the eye, and extending backwards, and widening so as to include the eye and ear, the latter being white at the tip. Lower jaw, throat, breast and belly, the interior of all the legs and the feet, black ; the back, shoulders, and rump, reddish grey ; the sides and tail light grey. Dimensions :—

	Feet.	In.	Lines.
Length of the head and body	2	3	0
„ of the head	0	6	3
„ of the ears	0	1	3
„ of the tail	0	7	6
Height at the shoulder	0	11	0



Genus, *Lutra*.

OTTER.

Generic Character.—Body elongated and low; feet with five toes on each, palmated; tail flattened horizontally; incisive teeth $\frac{3}{8}$, grinders $\frac{2}{3}$ or $\frac{4}{5}$; tongue slightly rough.

COMMON OTTER.

Lutra vulgaris.

Specific Character.—Deep brown, throat and breast cinereous; tail more than half the length of the head and body.

Lutra, RAY, Syn. Anim. Quad. KLEIN, de Quad. p. 91.

Mustela lutra, LINN. Syst. Nat. I. p. 66.

Lutra vulgaris, ERXLEB. Syst. p. 448. DESMAR. Mam. p. 188, sp. 289. FLEM. Brit. An. p. 16. JENYNS, Brit. Vert. p. 13.

La Loutre, BUFFON, Hist. Nat. VII. p. 134, t. ii.

Common Otter, PENN. Brit. Zool. I. p. 92, No. 19, t. viii. SHAW, Gen. Zool. I. p. 437, t. c.

WITH the general form and aspect which characterize its family, the Otter exhibits many modifications of that typical

structure, which are necessary to fit it for its aquatic and piscivorous habits. The generally elongated body is much flattened horizontally; the tail is flat and broad, forming an admirable rudder; the legs are short, and so loosely articulated as to allow of their being turned in every direction in the act of swimming; the feet are broad, and the toes distant and connected by a complete web; and the skin is protected by a compact fur, consisting of two very different kinds of hair;—the shorter being very soft and fine in its texture, to preserve the body from sudden changes of temperature; and the longer, coarse, hard and shining, which presents a very smooth, unresisting surface, as the animal cuts the water in its course. The teeth, too, though essentially similar to those of the rest of the group, are particularly strong, and their tubercles very pointed,—by which structure the animal is enabled to seize and to hold securely, its scaled and slippery prey.

From this conformation it is evident that every facility, consistent with the preservation of its structural relations to the rest of the group, is given to the Otter, for the pursuit and capture of its proper food. It swims and dives with great readiness, and with peculiar ease and elegance of movement; and although its action on land is far from being awkward and difficult, yet it is certainly in the water that the beautiful adaptation of its structure to its habits is most strikingly exhibited. It swims in nearly a horizontal position, and dives instantaneously after the fish that may glide beneath it, or pursues it under water, changing its course as the fish darts in various directions to escape from it, and, when the prey is secured, brings it on shore to its retreat to feed.

As the Otter lives exclusively on fish, when it can procure them, it frequents lakes, rivers, smaller streams or ponds, and not unfrequently descends to the sea: and the havoc which

it makes amongst the finny inhabitants is almost incredible. In feeding, it holds the fish between its fore-paws, eating first the head, and then downwards to the vent, leaving the tail. But it is not only to those which are necessary for its sustenance that its ravages are restricted,—for, as honest Izaak Walton says very truly, “The Otter devours much fish, and kills and spoils much more than he eats.”

The accounts which some writers have given of its habits are greatly exaggerated. We read of its excavating a very artificial habitation, burrowing under ground to a considerable distance; making the aperture of its retreat always under water, and working upwards, forming here and there a lodge, or dry resting-place, till it reaches the surface of the ground at the extremity of its burrow, and making there a breathing-hole, always in the middle of a bush or thicket.* This statement is wholly incorrect. The Otter avails itself of any convenient excavation, particularly of the hollows beneath the overhanging roots of trees which grow on the banks of rivers, or any other secure and concealed hole near its fishing-haunt; though in some cases it fixes its retreat at some distance from the water, and when driven by a scanty supply of fish, it has been known to resort far inland, to the neighbourhood of the farm-yard, and attack lambs, sucking pigs, and poultry,—thus assuming for a time the habits of its more terrestrial congeners.

It is asserted by some, that the Otter confines its haunts to the rivers and lakes, never descending to the sea. This, however, is a mistake. In the northern parts of Scotland they certainly frequent the sea, and extend their rambles to

* It is worthy of remark that this erroneous account of the retreat of the Otter is almost exactly similar to the haunt of the *Ornithorynchus*, as described by Mr. George Bennett, in the Transactions of the Zoological Society; though the former is to be found in books published ages before the latter animal was discovered.

a considerable distance from the shore ; and Mr. Couch of Polperro states that “ in the summer, and when the weather will permit, it occupies a retired and quiet station where the land stretches into the ocean. It swims low in the water, and will go a mile or more after its prey. The neighbourhood of a populous harbour is a frequent station. Fishes,” continues Mr. Couch, “ seem to have an instinctive dread of the Otter ; for I am credibly informed that it has been seen to collect into a shoal a vast number of trouts in a river, and to drive them before it until the greater part have thrown themselves on shore.”

Otter-hunting, formerly one of the most interesting and exciting amusements of which the English sportsman could boast, has of late years dwindled into the mere chase of extirpation. It was in other days pursued with much of the pomp and circumstance of regular sport : the Dogs were chosen for their perseverance and resolution ; “ good Otter-hounds,” says an old sportsman,—and Mr. Daniel mentions a cross between the Harrier and a Terrier as producing a good breed for the purpose,—“ will come chaunting and trailing along by the river-side, and will beat every tree-root, every osier-bed, and every tuft of bulrushes ;—nay, sometimes they will take the water, and beat it like a Spaniel.” The huntsmen and others of the party carried Otter spears, to strike the Otter when driven within their reach ; horsemen and footmen joined in the chase ; and the whole company formed a cavalcade of no inconsiderable extent and importance. These scenes are now no longer witnessed, or but rarely, in England ; but in Wales the chase of the Otter is still kept up with some spirit, in certain romantic districts of that romantic country. The sketch from which the vignette is taken, was kindly drawn for me by my friend John Morgan, Esq. and forms one of his memoranda of a day’s chase of this

animal, amidst the wild and picturesque scenery of Glamorganshire.

In beating for an Otter, it is necessary to mark the character and direction of his "seal," or footmark in the mud or soil, as well as the recent or older appearance of his "spraints," or dung. These signs of his having been either remotely or more recently on the spot will afford a tolerably certain indication whether the animal be still in the neighbourhood, or whether a further search must be made for later marks of his presence. When the Otter is found, the scene becomes exceedingly animated. He instantly takes the water, and dives, remaining a long time underneath it, and rising at a considerable distance from the place at which he dived. Then the anxious watch that is kept of his rising to "vent," the steady purpose with which the Dogs follow and bait him as he swims, the attempts of the cunning beast to drown his assailants, by diving whilst they have fastened on him, the baying of the hounds, the cries of the hunters, and the fierce and dogged resolution with which the poor hopeless quarry holds his pursuers at bay, inflicting severe, sometimes fatal wounds, and holding on with unflinching pertinacity even to the last,—must altogether form a scene as animated and exciting as the veriest epicure in hunting could desire.

The return from such a day's sport as this in the county of Carmarthen is thus described by a correspondent of the *Sporting Magazine*:—"Sitting near the window, I beheld approaching the bridge a cavalcade, and found it was Squire Lloyd of Glansevin, escorted by the gentlemen of the neighbourhood, returning from Otter-hunting. The gentlemen in the front rank were mounted; and next the horsemen were three men neatly dressed in scarlet coats and white trousers, with long spears, on which were suspended three huge Otters.

Now the huntsman appeared with his well-disciplined hounds; and then followed the cart, with nets, spears, and other paraphernalia; and an old ballad-singer appeared in the rear, who sung the praises of the high-bred hounds and their worthy master." Alas! that worthy "Squire Lloyd of Glansevin," the warlike deeds of whose ancestors were doubtless recounted and sung by the voices of a score of bards, should have the peaceful triumphs of his Otter-hunt chaunted by "an old ballad-singer!" The finest Otter-hunting on record, however, is probably that of a party in Essex, who, in the year 1796, killed nine Otters in one day.

That the Otter may not only be readily and easily tamed and domesticated, but taught to catch and bring home fish for its master, is a fact which is so well known, and has been so often proved, that it is surprising it should not have been more frequently acted upon. From Albertus Magnus down to the late excellent Bishop Heber, instances have been continually narrated, some of which have gone no further than the domestication of pet Otters, whilst in others the animal has been rendered a useful purveyor of fish for the family table. Amongst other writers who have attested similar facts, honest Izaak Walton says, "I pray, sir, save me one [young Otter], and I'll try if I can make her tame, as I know an ingenious gentleman in Leicestershire, Mr. Nicholas Seagrave, has done; who hath not only made her tame, but to catch fish, and do many other things of much pleasure." Albertus Magnus, Aldrovandus, Gesner, and others, had asserted it; yet Buffon, losing for once his accustomed credulity, and running to an opposite extreme, refuses to believe in the susceptibility of the Otter to be brought to a state of domesticity. The former of these writers states that, in Sweden, Otters were kept in the houses of the great for the express purpose of catching fish, which they would do at

a signal from the cook, and bring home their provender to be dressed for dinner. Numerous instances have been recorded in later times, by Daniel, Bewick, Shaw, and others ; in one of which an Otter had been known to take eight or ten salmon in a day : and the following passage in the journal of Bishop Heber confirms some previous statements, that one of the Asiatic species, probably *Lutra nair*, (Fr. Cuv.) may be rendered similarly useful :—" We passed, to my surprise, a row of no less than nine or ten large and very beautiful Otters, tethered with straw collars and long strings to bamboo stakes on the banks (of the Matta Colly). Some were swimming about at the full extent of their strings, or lying half in and half out of the water ; others were rolling themselves in the sun on the sandy bank, uttering a shrill, whistling noise, as if in play. I was told that most of the fishermen in this neighbourhood kept one or more of these animals, who were almost as tame as Dogs, and of great use in fishing ; sometimes driving the shoals into the nets, sometimes bringing out the larger fish with their teeth. I was much pleased and interested with the sight. It has always been a fancy of mine that the poor creatures whom we waste and prosecute to death, for no cause but the gratification of our cruelty, might by reasonable treatment be made the sources of abundant amusement and advantage to us." This interesting account justifies the conclusion drawn by the good prelate from the scene that so much delighted him, that "the simple Hindoo shows here a better taste and judgment than half the Otter-hunting and Badger-baiting gentry of England." With such instances as these before us, there seems to be no reason why this animal, so tractable and docile as it is proved to be, should not be very generally domesticated for the purposes of sport, or employed by fishermen as a means of assisting them in their calling.

The method which has been recommended to train them to this purpose is as follows:—They should be procured as young as possible, and they are at first fed with small fish and water. Then bread and milk is to be alternated with the fish, and the proportion of the former gradually increased till they are led to live entirely on bread and milk. They are then taught to fetch and carry, exactly as Dogs are trained to the same trick; and when they are brought to do this with ease and docility, a leather fish stuffed with wool is employed for the purpose. They are afterwards exercised with a dead fish, and chastised if they disobey or attempt to tear it; and finally, they are sent into the water after living ones. In this way, although the process is somewhat tedious, it is believed that the Otter may be certainly domesticated, and rendered subservient to our use.

The fur of the Otter is very much valued in many other countries, but has been less employed in England. Great numbers of the skins of the American Otter are annually imported here, to be again exported to the North of Europe, &c.*

The female goes with young nine weeks, and produces from three to five young ones, in March or April. The nest is formed of grass and other herbage, and is usually placed in some hole in the bank of a river, protected either by the overhanging of the bank, or by the projecting roots of a tree.

The habits of the Otter, and its rank fishy taste, have procured for it the distinction of being permitted by the Church of Rome to be eaten on maigre days. The quiet humour of

* The number of Otter-skins imported into this country in

1830	was	713,115
1831	„	494,067
1832	„	222,493
1833	„	23,889.

After September 1st 1833, the duty was reduced from $\frac{3}{4}$ d. each to 1s. per hundred, since which I believe the importation has gradually increased.

good old Izaak Walton could not rest without a sly hit at this fact :—

“ *Piscator*. I pray, honest huntsman, let me ask you a pleasant question : do you hunt a beast, or a fish ?

“ *Hunt*. Sir, it is not in my power to resolve you ; yet I leave it to be resolved by the College of *Carthusians*, who have made vows never to eat flesh. But I have heard the question hath been debated among many great clerks, and they seem to differ about it ; yet most agree that *her tail is fish* : and if her body be fish too, then I may say that a fish will walk upon land (for an Otter does so), sometimes five or six or ten miles in a night.”

Now, were we to adopt the reference recommended by honest Izaak, the description of this animal would have fallen within the province of my good friend Mr. Yarrell rather than mine ; for, says Pennant, “ in the kitchen of the Carthusian convent near Dijon, we saw one preparing for the dinner of the religious of that rigid order, who, by their rules, are prohibited during their whole lives the eating of flesh.”

In Daniel's Rural Sports occurs the following notice of a spotted variety of the Otter :—“ In Scotland the vulgar have an opinion that there is a king or leader among the Otters, spotted with white, and larger. They believe that it is never killed without the sudden death of a man or of some animal at the same instant ; that its skin is endowed with great virtue as an antidote against infection, a preservative of the warrior from wounds, and ensures the mariner from all disasters upon the sea.” In Stoddart's work on Angling, a similar notice occurs ; and Mr. Blyth of Tooting, an ardent investigator of nature, has favoured me with the following information :—“ On my inquiring of an Aberdeenshire friend if he knew of the Spotted Otter, he at once answered that

he supposed I meant the King of the Otters ; showing that at least it is currently known. My friend even knew of a rivulet where one had been taken, though he himself had never seen it." It is doubtless the same variety as that mentioned by Desmarest, and stated by Lesson to have been found near Paris. The specimen alluded to is in the Museum of the Jardin des Plantes, and is of a lively yellowish brown colour, whitish brown beneath ; the sides of the head, the throat, and the upper parts of the neck, whitish ; and the whole of the upper part of the fur irregularly spotted with pure white.

There is in the Museum of the Zoological Society of London a beautiful specimen of an Irish Otter, presented by Mr. Ogilby, who considers it to be a distinct species from that of England. " On account of the intensity of its colouring, which approaches nearly to black, both on the upper and under surface ; of the less extent of the pale colour beneath the throat, as compared with the Common Otter as it exists in England ; and of some difference in the size of the ears, and the proportions of other parts ; Mr. Ogilby has long considered the Irish Otter as constituting a distinct species ; and he feels strengthened in this view of the subject by the peculiarity of its habits and manners. It is, in fact, to a considerable extent a marine animal, being found chiefly along the coast of the county of Antrim, living in hollows and caverns formed by the scattered masses of the basaltic columns of that coast, and constantly betaking itself to the sea when alarmed or hunted. It feeds chiefly on the salmon ; and as it is consequently injurious to the fishery, a premium is paid for its destruction, and there are many persons who make a profession of hunting it, earning a livelihood by the reward paid for it, and by disposing of its skin." Mr. Ogilby had not had an opportunity of comparing it

minutely with the Common Otter, or of examining its osteology : until this has been done, it would be premature to admit it as a distinct species ; and I may be allowed to add, that in the stuffed specimen above mentioned, I do not find characters sufficiently distinct to lead to the belief that it is more than a very dark and handsome variety of the common species. The Otters of Zetland are equally marine in their habits, and, judging from two beautiful skins presented to me by John Bruce, Esq. of Sumburgh, they are almost as dark-coloured : these skins are evidently larger than those usually found in England, and the fur is nearly as fine as those imported from America. The size of the Otter varies considerably even in England. The usual weight of a fine male is from twenty to twenty-four pounds ; that of the female, about four pounds less : but Pennant records one which was found in the year 1794 in the river Lea, between Hertford and Ware, the weight of which was forty pounds.

The head is broad and flat ; the muzzle very broad ; the upper lip thick, and hanging over the lower, which it partly conceals ; whiskers very thick and strong ; eyes situated an inch behind the nostrils, small, black, the cornea remarkably prominent ; ears short and rounded : body very long and low ; legs short ; feet palmate, the toes being furnished with a perfect and strong inter-digital web, and with short claws, which are somewhat turned up, though not retractile. Tail little more than half as long as the body and head together, very broad and strong at the base, and flattened horizontally : two small glands, secreting a fetid liquid, under the tail.

The fur consists of two distinct and very different kinds of hair ; the shorter being extremely fine and soft, of a whitish grey colour, and brown at the tips ; the longer hair stiffer and thicker, very shining, greyish at the base, bright rich brown at the points, especially on the upper parts and the

outer surface of the legs: the throat, the cheeks, the breast, belly, and inner parts of the legs, brownish grey throughout.

Dimensions of a specimen sent to me from Sutherlandshire:—

					Feet.	In.	Lines.
Length of the head and body	.	.	.	.	2	1	6
„ of the head	.	.	.	.	0	4	10
„ of the ears	.	.	.	.	0	0	8
„ of the tail	.	.	.	.	1	4	0

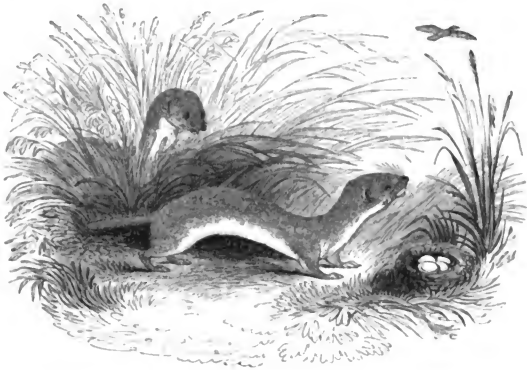
Dentition:—

$$I. \frac{3}{2} : C. \frac{3}{2} : F. M. \frac{3}{2} : M. \frac{4}{2} = \frac{11}{2}.$$



CARNIVORA.

MUSTELIDÆ.

Genus, *Mustela*.

WEASEL.

Generic Character.—Body elongated, vermiform : feet short ; toes separate ; claws sharp : grinding teeth $\frac{2}{3}$; tongue rough.

COMMON WEASEL.

Mustela vulgaris.

Specific Character.—Reddish brown above, white beneath ; tail of the same colour as the body.

Mustela vulgaris, LINN. Syst. Nat. DESMAR. Mam. p. 179, sp. 275. FLEM.

Brit. An. p. 13. JENYNS, Brit. Vert. p. 12.

La Belette, BUFFON, Hist. Nat. VII. p. 225, t. xxix. f. 1.

Common Weasel, PENNANT, Brit. Zool. I. p. 95, t. vii. No. 17. SHAW, Gen. Zool. I. p. 420, t. xcvi.

With the fur white.

Mustela nivalis, LINN. Fn. Suec. II. p. 7.—Syst. Nat. I. p. 69. MULL. Zool. Prod. p. 3.

THE near approximation in figure and character, and the great general similarity in habits, which a comparison between

the Stoat and Weasel presents, have occasioned considerable confusion in some of the accounts which have been given of their history; though the difference of size and colour would at once be sufficient to distinguish the species, were there no other points of disagreement between them. The Stoat is brown above, dirty white beneath; the tail always black at the tip, longer and more bushy than that of the Weasel, and the former animal is twice as large as its elegant little congener: the Weasel, on the other hand, is red above, pure white beneath, the tail red and uniform. Their habits also, though generally similar, are, in many of their details, considerably distinct; and we are fully borne out by observation, in saying that the accusations which are so current against the Weasel, of the mischief which he is said to perpetrate in the farm-yard and the hen-roost, as well as amongst game of every description, on Hares and Rabbits no less than on the feathered tribes, are principally due to the Stoat.

It is not meant to be asserted that the Weasel will not, when driven by hunger, boldly attack the stock of the poultry-yard, or occasionally make free with a young Rabbit or a sleeping Partridge; but that its usual prey is of a much more ignoble character, is proved by daily observation. Mice of every description, the Field and the Water Vole, Rats, Moles, and small birds, are their ordinary food; and from the report of unprejudiced observers, it would appear that this pretty animal ought rather to be fostered as a destroyer of vermin, than extirpated as a noxious depredator. Above all, it should not be molested in barns, ricks, or granaries, in which situations it is of great service in destroying the colonies of Mice which infest them. Those only who have witnessed the multitudinous numbers in which these little pests are found, in wheat-ricks especially, and have seen the man-

ner in which the interior is sometimes drilled, as it were, in every direction by their runs, can at all appreciate the amount of their depredations ;* and surely the occasional abduction of a chicken or a duckling, supposing it to be even much more frequently chargeable against the Weasel than it really is, would be but a trifling set-off against the benefit produced by the destruction of those swarms of little thieves.

The Weasel climbs trees with great facility, and surprises birds on the nest, sucks the eggs, or carries off the young. It has been asserted that it attacks and destroys snakes : this, however, I believe to be entirely erroneous. I have tried the experiment by placing a Weasel and a common snake together in a large cage, in which the former had the opportunity of retiring into a small box in which it was accustomed to sleep. The mutual fear of the two animals kept them at a respectful distance from each other ; the snake, however, exhibiting quite as much disposition to be the assailant, as its more formidable companion. At length the Weasel gave the snake an occasional slight bite on the side or on the nose, without materially injuring it, and evidently without any instinctive desire to feed upon it ; and at length, after they had remained two or three hours together, in the latter part of which they appeared almost indifferent to each other's presence, I took the poor snake away and killed it.

Far different was this Weasel's conduct when a Mouse was introduced into the cage : it instantly issued from its little box, and, in a moment, one single bite on the head pierced the brain, and laid the Mouse dead without a struggle or a cry. I have observed that when the Weasel seizes a small animal, at the instant that the fatal bite is inflicted, it throws its long lithe body over its prey, so as to secure it

* A friend of mine assures me that at least three bushels of different species of Mice have been killed out of one wheat-rick.

should the first bite fail ; an accident, however, which I have never observed to occur when a Mouse has been the victim. The power which the Weasel has of bending the head at right angles with the long and flexible, though powerful neck, gives it great advantage in this mode of seizing and killing its smaller prey. It also frequently assumes this position when raising itself on the hinder legs to look around.

The disposition which has been attributed to the Weasel of sucking the blood of its prey, has, I believe, been generally much exaggerated. Some persons have positively denied the existence of such a propensity, and my own observation, as far as it goes, would tend to confirm that refutation of the commonly received notion. The first gripe is given on the head, the tooth in ordinary cases piercing the brain, which it is the Weasel's first act of epicurism to eat clean from the skull. The carcase is then hidden near its haunt, to be resorted to when required, and part of it often remains until it is nearly putrid.

The Weasel pursues its prey with facility into small holes, and amongst the close and tangled herbage of coppices, thickets, and hedgerows. It follows the Mole and the Field Mouse in their runs ; it threads the mazes formed in the wheat-rick by the colonies of Mice which infest it ; and its long flexible body, its extraordinary length of neck, the closeness of its fur, and its extreme agility and quickness of movement, combine to adapt it to such habits, in which it is also much aided by its power of hunting by scent,—a quality which it partakes in an equal degree with the Stoat. In pursuing a Rat or a Mouse, therefore, it not only follows it as long as it remains within sight, but continues the chase after it has disappeared, with the head raised a little above the ground, following the exact track recently taken by its destined prey. Should it lose the scent, it returns to the

point where it was lost, and quarters the ground with great diligence till it has recovered it; and thus, by dint of perseverance, will ultimately hunt down a swifter and even a stronger animal than itself. But this is not all. In the pertinacity of its pursuit, it will readily take the water, and swim with great ease after its prey.

It is, however, sometimes itself the prey of hawks; but the following fact shows that violence and rapine, even when accompanied by superior strength, are not always a match for the ingenuity of an inferior enemy. As a gentleman of the name of Pinder, then residing at Bloxworth in Dorsetshire, was riding over his grounds, he saw, at a short distance from him, a kite pounce on some object on the ground, and rise with it in his talons. In a few moments, however, the kite began to show signs of great uneasiness, rising rapidly in the air, or as quickly falling, and wheeling irregularly round, whilst it was evidently endeavouring to force some obnoxious thing from it with its feet. After a short but sharp contest, the kite fell suddenly to the earth, not far from where Mr. Pinder was intently watching the manœuvre. He instantly rode up to the spot, when a Weasel ran away from the kite, apparently unhurt, leaving the bird dead, with a hole eaten through the skin under the wing, and the large blood-vessels of the part torn through. A similar anecdote is related in Loudon's Magazine of Natural History, where the *dramatis personæ* were a Stoat and an Eagle; but the truth of it appears not to be vouched for by the narrator. Of the accuracy of the present fact there is, however, no doubt, as I knew Mr. Pinder well, and have often heard the circumstance related.

The female Weasel is much smaller than the male, and is probably the "little reddish beast, not much bigger than a Field Mouse, but much longer," mentioned by White in

his Natural History of Selbourne, and called 'Cane' by the people of that district. It is known in Surrey also by the name of 'Kine,' as Mr. Blyth informs me. She brings forth four, or more frequently five young, and is said to have two or three litters in a year. The nest is composed of dry leaves and herbage, and is warm and dry, being usually placed in a hole in a bank, in a dry ditch, or a hollow tree. She will defend her young with the utmost desperation against any assailant, and sacrifice her own life rather than desert them; and even when the nest is torn up by a Dog, rushing out with great fury, and fastening upon his nose or lips.

Sometimes, though rarely, the Weasel becomes white in the winter; and the tail, though paler than at other times, always retains its reddish tinge, as that of the Ermine does its black tip. In this state it is the *M. nivalis* of Linnæus. One which I received from the extreme north of Scotland had two white spots on each side of the nose, which it retained through the summer.

The name is Teutonic; the Anglo-Saxon word being 'Wesle,' and the Danish 'Væsel;' which latter, however, is equally applied to the Ermine.

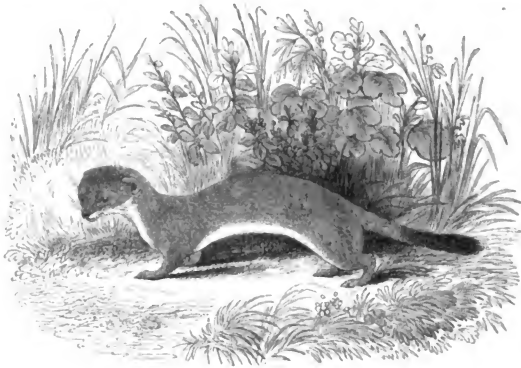
I have chosen to retain the generic appellation *Mustela* for the present form, in preference to *Putorius*, applied to it as a sub-genus by Cuvier, because I consider it as the type of the family; for which reason also, the word *Martes* having been assigned by Ray to the Martens, I have retained it for that genus instead of *Mustela*. This I believe to be consistent with the best rules of terminology; a matter which, though perhaps not of first-rate importance, is often much underrated.

The general form and aspect of the Weasel show it to be typical in the group of vermiform Carnivora. The body is extremely slender and arched; the head small and flattened;

the eyes black, and remarkably quick and lively ; the ears short and rounded : the neck is very long, being but little shorter than the trunk, and very flexible ; the tail short, not one-third the length of the head and body, smaller than that of the rest of the genus, and without the terminal tuft of long hair which exists in the Stoat : legs short, and furred to the end of the toes : fur short and close. The colour of the upper part of the head, neck, and body, the tail, the feet, and the outer surface of the legs, is a light reddish brown ; the whole of the inferior parts quite white. Dimensions :—

	Inch. Lines.			Inch. Lines.	
Length of the head and body (of the male)	8	3	(of the female)	7	0
„ of the head	„	1 9	„	1	6
„ of the ears	„	0 4	„	0	3
„ of the tail	„	2 4	„	2	0





ERMINE WEASEL.

STOAT, STOUT, GREATER WEASEL.

Mustela erminea. Linn.

Specific Character.—Body reddish brown above, white beneath; (in winter wholly white;) extremity of the tail always black.

Mustela erminea, LINN. Fn. Suec. II. p. 6, n. 17.—Syst. Nat. I. p. 68.
 DESMAR. Mammal. p. 180, sp. 277. FR. CUVIER, in
 Dict. des Sc. Nat. XXIX. p. 250. FLEM. Brit. An.
 p. 13. JERNYNS, Brit. Vert. p. 13.

Viverra erminea, SHAW, Gen. Zool. I. p. 426, t. xcix.

In the summer dress :—

Roselet, BUFFON, Hist. Nat. VII. p. 240, t. xxxi. f. 1.

Stoat, PENN. Brit. Zool. p. 84.

In the winter dress :—

L'Hermine, BUFFON, l. c. p. 240, t. xxix. f. 2.

Ermine, PENN. l. c. p. 84.

THE habits of the Stoat or Ermine, in this country at least, differ from those of the Weasel, principally with relation to the difference of size. Although much more destructive than that animal to poultry and to game, the favourite object of its pursuit is the Common Rat, and the Water

Vole; as that of the Weasel is the different species of Mice. Prevented from following the latter little pests into their runs, which are often not much larger than their own bodies, the Stoat leaves such small game to its little congener, and betakes itself to prey more suited to its own bulk. It occasionally attacks Hares, even half or two-thirds grown; pursuing them with the utmost pertinacity, and hunting them down by dint of its indefatigable perseverance. The Rev. F. W. Hope informs me that on one occasion, when shooting in Shropshire, he heard at a short distance the shrill loud scream of a Hare, which he concluded was just caught in a poacher's springe. On running towards the spot from which the sound proceeded, he saw a Hare limping off greatly distressed, with something attached to the side of the throat, which a nearer approach showed to be a Stoat. The Hare made its way into the brushwood with its enemy still holding on. It is a curious fact, that the Hare when pursued by the Stoat does not betake itself to its natural means of escape, its fleetness of foot, which would in a few seconds carry it out of all danger from its little enemy, and which it always employs when escaping from the chase of Dogs or of the Fox: on the contrary, it hops languidly along, evidently aware of the Stoat's approach, yet as if incapable of exerting its powers to avoid the impending destruction. Whether this arises from a stupid indifference, or from not appreciating its danger, or, on the other hand, from intense terror, producing an effect similar to that mis-called fascination, which the small bright eye of the Rattlesnake excites in its helpless victims, it is perhaps difficult to decide.

The Stoat is certainly one of the boldest animals of its size. It pursues its prey with the greatest intrepidity even into circumstances of considerable danger, and, like the Weasel, will follow it into the water: it will also cross the water for the pur-

pose of besieging the haunts of the Water Vole, *Arvicola amphibius*, of which it destroys great numbers. In swimming, "it lifts the head and neck well out of the water like a dog." It hunts its prey by scent;—a fact observed by my father very many years since, and lately stated by my friend Mr. Hogg, in his interesting paper on the habits of the Stoat, to which I shall have occasion again to refer. In short, in all these circumstances, its habits are exactly similar to those of the Weasel. Like that animal too, it is known often to make use of the excavations of the Mole for its winter retreats.

The female brings about five young ones in the month of April or May.

The winter change of colour which this species so universally assumes in northern climates, is not only matter of much interest to the naturalist and the physiologist, but, as we shall presently see, of considerable importance also in a commercial point of view. The whole of the coloured parts of the fur become of the purest white excepting the extremity of the tail, which remains permanently black; and the under parts retain a slight yellowish tinge. This is effected, as I believe, not by the loss of the summer coat, and the substitution of a new one for the winter, but by the actual change of colour in the existing fur. It is not perhaps easy to offer a satisfactory theory for this phenomenon, but we may perhaps conclude that it arises from a similar cause to that which produces the grey hair of senility in man, and some other animals: of this instances have occurred in which the whole hair has become white in the course of a few hours, from excessive grief, anxiety, or fear; and the access of very sudden and severe cold has been known to produce, almost as speedily, the winter change, in animals of those species which are prone to it. This transition from one state of the coat to the other, does

not take place through any gradation of shade in the general hue, but by patches here and there of the winter colour intermixed with that of the summer, giving a pied covering to the animal.

In northern latitudes, even in the alpine districts of Scotland, this change is universal; but farther south it becomes an occasional, and even rare occurrence. In Northumberland, Durham, and other counties in the north of England, it is very frequent, although far from general: in Lincolnshire, Cambridgeshire, and the midland counties generally, it is sometimes seen; and there are two specimens of the Ermine in the Museum of the Philosophical Society of Cambridge taken in that county. Mr. Couch of Polperro states that he has seen it more than once in Cornwall.

It appears to be established that, whatever may be the change which takes place in the structure of the hair, upon which the alteration of colour immediately depends, this transition from the summer to the winter colours is primarily occasioned by actual change of temperature, and not by the mere advance of the season. The observations of my friend John Hogg, Esq. contained partly in an excellent paper on the subject in the fifth volume of Loudon's Magazine of Natural History, and partly in a letter with which he has favoured me since the publication of that paper, tend amply to confirm this view of the matter. "Within the last nine years," says Mr. Hogg, writing from the county of Durham, "I have had the good fortune to meet with two Ermines alive, and in two of the most different winters that have occurred for a great many years: the one was in the extremely severe winter of January to March 1823, and the other was in the almost as extremely mild January of the present year (1832). In consequence of the months of December 1831 and January 1832 having been so extremely

mild, I was greatly surprised to find this Stoat clothed in his winter fur ; and the more so, because I had seen, about three weeks or a month before, a Stoat in its summer coat or brown fur. I was therefore naturally led to consider whether the respective situations, which the brown and white Stoats seen by me this warm winter inhabited, could alone account for the difference of the colours of their fur, in any clear and satisfactory manner. The situation then, where the brown Stoat was seen, is in N. lat. $54^{\circ} 32'$ nearly, and W. long. $1^{\circ} 19'$ nearly, upon a plain elevated a very few feet above the level of the river Tees, in the county of Durham. Again, the place where I met with the Ermine, or white Stoat, on the 23rd of January 1832, is in the North Riding of Yorkshire, in N. lat. $54^{\circ} 12'$ nearly, and W. long. $1^{\circ} 13'$ nearly : it is situated at a very considerable elevation, and in the immediate neighbourhood of the lofty moorlands called the Hambleton Hills. These constitute the south-western range of the Cleveland Hills, which rise in height from 1100 feet to 1200 feet above the sea. At the time, the Ermine was making its way towards the hills, where, no doubt, he lived, or frequently haunted ; and consequently, the great coldness of the atmosphere even in so mild a winter, upon so elevated and bleak a spot as that moorland, would satisfactorily account for the appearance of the animal in its white fur ; although the place is in a direct line more than twenty-three miles distant to the south of the fields near the Tees, inhabited by the brown Stoat."

The following statement of an experiment recorded in the account of the former voyage of Captain Ross to the Polar regions, offers an interesting confirmation of this opinion, though the animal which was the subject of it belonged to a very different group. It was the Hudson's Bay Lemming.

"As it retained its summer fur, I was induced to try the

effect of exposing it to the winter temperature. It was accordingly placed on deck in a cage on the 1st of February; and next morning, after having been exposed to a temperature of 30° below zero, the fur on the cheeks and a patch on each shoulder had become perfectly white. On the following day the patches on the shoulders had extended considerably, and the posterior part of the body and flanks had turned to a dirty white. At the end of a week it was entirely white, with the exception of a dark band across the shoulders, prolonged posteriorly down to the middle of the back." It is unnecessary to pursue the details of this cruel but conclusive experiment further; it obviously proves that a low temperature alone is sufficient to blanch the fur in such animals as are susceptible of such a change. It also clearly shows that the view which I have taken of the mode in which this change takes place, by the actual change of colour in the existing fur, is the true one.*

But what is the *final cause* of this curious phenomenon? What object, connected with the well-being of the subjects of it, does it effect in their favour? One object undoubtedly is the safety they obtain by the concealment afforded them, by an approximation to the colour of the earth's winter covering. The Ptarmigan, the Alpine Hare, and many other mammalia and birds, are all more or less liable to become the prey of rapacious birds or quadrupeds, which are directed in the chase by their sight. The mottled browns which form the principal summer colours of these creatures, are well adapted for their concealment amongst the brown heaths and fern of the summer and autumn; but such colours

* Mr. Blyth, however, informs me that he has come to a different conclusion. He writes to me as follows:—"Authors are wrong in what they have advanced respecting the mode in which this animal changes its colour, at least in autumn; for in a specimen which I lately examined, which was killed during its autumnal change, it was clearly perceivable that the white hairs were all new, and not the brown changed in colour."

would render them conspicuous by contrast amongst the snows of winter.

But this, though perhaps the most obvious, is not the most important advantage gained by the assumption of the white clothing in the winter season. It is too well known to require more than an allusion, that although the darker colours absorb heat to a greater degree than lighter ones, so that dark-coloured clothing is much warmer than light-coloured, when the wearer is exposed to the sun's rays—the radiation of heat is also much greater from dark than from light-coloured surfaces, and consequently the animal heat *from within* is more completely retained by a white than by a dark covering: the temperature therefore of an animal having white fur, would continue more equable than that of one clothed in darker colours, although the latter would enjoy a greater degree of warmth whilst exposed to the sun's influence. Thus the mere presence of a degree of cold, sufficient to prove hurtful if not fatal to the animal, is itself the immediate cause of such a change in its condition as shall at once negative its injurious influence.

This winter change of the fur, and the permanency of the black colour of the tail, render the fur of the Ermine one of the most beautiful and valuable. When made up, the tails are inserted, one to each skin, at regular distances, and in the quincunx order; and the pure white of the skin is thus relieved and set off by the rich black of the tail. It is not only much used for the winter garments of ladies, but it forms the distinctive doubling of the robes of state of kings and nobles, as well as of their crowns and coronets. The early employment of this fur for such uses, occasioned its introduction amongst the tinctures of heraldry, in which it is frequently adopted, either as the ground of the shield, or the colour of the bearings.

The few specimens of the fur which could be obtained in this country, even in the northern parts of the island, are very inferior, in beauty and value, to those which are imported from those far northern climates in which they abound, as Russia, Norway, Siberia, and Lapland; where they must be exceedingly numerous, as our own importation alone in 1833 amounted to 105,139. The great superiority of these northern skins consists in the fur being longer, thicker, and of a purer and brighter colour.

The derivation of the word Stoat is very probably, as Skinner has it, from the Belgic 'Stout,' bold; and the name is so pronounced in Cambridgeshire and in some other parts of England to the present time. Gwillim, in his "Display of Heraldrie," gives the following etymology of Ermine:—"This is a little beast, lesse than a Squirrell, that hath his being in the woods of the land of Armenia, whereof hee taketh his name."

The Stoat is about one-third larger than the Weasel, which in its form it almost exactly resembles; the head is a little broader in proportion to its length, and the tail longer. The upper part of the head, neck, and body, and the greater part of the tail, are of a pale reddish brown colour; the under parts white, with a very slight tinge of yellow; margins of the ears and toes white; tip of the tail black, and somewhat bushy. In the winter the whole of the body becomes white, slightly tinged with yellow, the extremity of the tail remaining permanently black. In the autumn and in the spring, it is found pied with patches of the summer colour, intermixed with the white of winter. Dimensions:—

	Inch.	Lines.
Length of the head and body	9	10
„ of the head	1	9
„ of the ears	0	5
„ of the tail	4	8



FITCHET WEASEL.

FITCHET, POLECAT, FOU MART, FULIMART.

Mustela putorius.

Specific Character.—Fur long, brown on the surface, yellowish beneath ; head blackish, with white spots about the ears and mouth : tail about one-third the length of the head and body.

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| <i>Mustela putorius</i> , | LINN. Fn. Suec. II. f. 6.—Syst. Nat. I. p. 167. | DESMAR. |
| | Mammal. p. 177, sp. 271. | FLEM. Brit. An. p. 14. |
| | JENYNS, Brit. Vert. p. 11. | |
| <i>Viverra putorius</i> , | SHAW, Gen. Zool. I. p. 415, t. xcvi. | |
| <i>Putois</i> , | BUFFON, Hist. Nat. VII. p. 199, t. cxxiii. | |
| <i>Fitchet Weasel</i> , | PENNANT, Brit. Zool. I. p. 89, t. vi. | |
| <i>Polecat</i> , | SHAW, Gen. Zool. I. c. | |

THE FITCHET, or, as it is more frequently termed, the Polecat, although smaller than either of the Martens, is the largest of the indigenous species of the restricted genus *Mustela*. In its habits it greatly resembles the two former spe-

cies ; but instead of being contented with the lesser quadrupeds and birds, it attacks Rabbits, Hares, or Partridges, and commits great ravages in the hen-house or poultry-yard, where it destroys great numbers, not only of chickens and ducklings, but of full-grown poultry ; and even ventures to attack geese and turkeys ;—no less than sixteen of the latter large and powerful birds, having been known to be killed by a single Polecat, in the course of one night : for, like the other species of the genus, it takes advantage of opportunity, and destroys many more than it can eat at once ; and after making an epicurean repast on the brains, and quenching its thirst with the blood of its victims,—in which peculiarities it probably exceeds most of the other Weasels,—it carries off the carcasses to its haunts, where portions of them are often found in a state of putridity. Their usual place of retirement is in woods or coppices situated at no great distance from farms ; from whence they issue about the dusk of evening, or later, to prey upon any living thing, of manageable size, which may come within their reach. Nevill Wood, Esq. of Foston Hall in Derbyshire, informs me that “some years ago he had ten fine young ducks, which were shut up every night in a small outhouse, destroyed in one night by a Polecat ; and on entering the place in the morning, he found every one of them lying dead, each with a hole in the neck ; and in a few moments, the perpetrator of the bloody deed marched out towards him, licking his yet bloody jaws, and without exhibiting the slightest alarm. Indeed,” says Mr. Wood, “it is a curious fact, that this animal generally kills all the poultry in the apartment it plunders, be they never so many.”

But if the Polecat be so formidable an enemy to the farm-yard, it is not less so to the game-preserve and the warren. The destruction which it occasions amongst the eggs and

young of Pheasants and Partridges, young Hares, and Rabbits, is incalculable; and in the latter case particularly, it follows these animals into their burrows with such facility, that a single family of Polecats would shortly produce a sensible diminution in numbers, amongst the denizens of a whole warren.

Bewick has given a figure of the Fitchet—and a very spirited one it is—in the act of holding an eel which he has just caught. This figure is intended to perpetuate a curious fact, of an individual of this species having been observed repeatedly to resort to the bank of a river in search of those fish, of which no less than eleven were found in its retreat. A no less curious example of aberrant appetite in this animal is related in Loudon's Magazine,* of a female Polecat which was pursued to her nest, where were found five young ones “comfortably embedded in dry withered grass; and where they were lodged, all things were tight and snug to a wonder; but,” says the narrator, “in a side hole I picked out and counted most carefully, forty large frogs and two toads. These were all alive, but merely so; capable of sprawling a little, and that was all: for the mother had contrived to strike them all with palsy. They were merely capable of sprawling, and not of moving away; and on examination I found that the whole number, toads and all, were bitten through the brain.” There are numerous facts confirmatory of this predilection for frogs; and it is perfectly consistent with the habits of some of its congeners. A tame Grison, *Galictis vittata*, which I possessed for several years, was very fond of frogs; but these were not the only reptiles which were obnoxious to its voracity. On one occasion, in the winter, I had placed it in its cage, in a room with a fire, where I had also two young alligators, which in general were stupidly

* Vol. vi. p. 206.

tame : on going into the room in the morning, I found the Grison at large, and one of the alligators dead, with a hole eaten under the fore-leg, where the great nerves and blood-vessels were torn through ; and the other alligator began snapping furiously at every one who attempted to approach it.

The female Polecat brings four, five, or six young, in May, or the beginning of June. She makes her nest in some retired place, in a rabbit-burrow, in holes of rocks, or amongst heaps of stones grown over with herbage or brush-wood.

The long fur of this animal, though far less beautiful and of inferior value to that of the Sable, or even of the Marten, is still much esteemed, and numbers are annually imported here from the North of Europe, under the name of *Fitch*.

The common name of this species, *Polecat*, is probably nothing more than *Polish Cat*. *Foumart*, *Fulmart*, *Fulimart*, are contractions of *Foul Marten*, a name applied to it in contradistinction to the *Sweet Marten*, on account of the disgusting odour, produced by the exudation of a fetid secretion, from a pouch or follicle under the tail, and which is even more intolerable than that of the Common Weasel or the Stoat.

The general form of the Fitchet is rather stouter in proportion than that of either of the former species ; the head is broader ; the nose rather sharp ; the ears round and not very conspicuous ; the neck of less proportional length than in the others ; the tail rather bushy, and little more than one-third the length of the body and head. The fur of the body is of two sorts ; the shorter being woolly, of a pale yellowish or fulvous colour ; the longer, shining, and of a rich black or brownish black. From this results a general brown colour, mixed with yellow, which varies according to the proportion in which the two kinds of fur are seen. The head,

tail, and feet are the darkest parts; and some marks about the mouth and the ears are white.

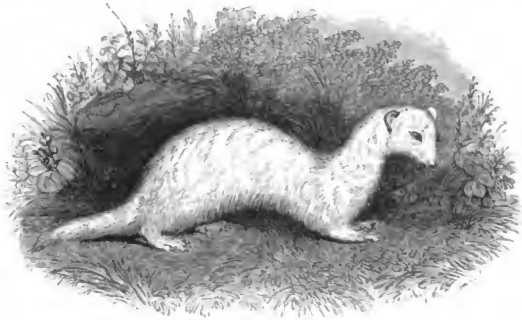
Dimensions :—

						Ft. In. Lines.
Length of the head and body	.	.	.	.	.	1 5 6
„ of the head	.	.	.	.	.	0 2 9
„ of the ears	.	.	.	.	.	0 0 6
„ of the tail	.	.	.	.	.	0 5 5



CARNIVORA.

MUSTELIDÆ.



THE FERRET WEASEL.

Mustela furo. (Linn.)*Specific Character.*—"Yellowish white; eyes red."*Mustela furo*, LINN. Syst. Nat. I. p. 68. DESMAR. Mammal. p. 178, sp. 273.

JENYNS, Brit. Vert. p. 12.

,, *putorius*, var. FLEM. Brit. An. p. 14.*Viverra furo*, SHAW, Gen. Zool. I. p. 418.*Le Furet*, BUFFON, Hist. Nat. VII. p. 209, t. xxvi. CUV. R g. An. I. p. 143.*The Ferret*, MERRETT, Pinax, p. 167. PENN. Brit. Zool. I. p. 91.

THAT the Ferret, in its natural condition, possesses habits nearly similar to the Polecat, is clearly indicated by its great resemblance in point of structure and form. But in this climate it exists only in a state of domestication;—indeed its true natural colour and appearance are so little known, that, up to the present day, it is considered by many as being merely a variety of the Polecat. In support of this opinion, it is urged that they will readily breed together; and it has often been stated that the breeders of Ferrets will

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improve the race by the admixture of the other animal. Pennant states that "the Rev. Mr. Lewis, Vicar of Llancowel in Caermarthenshire, had a tame female Ferret, which was permitted to go about the house; at length it absented itself for several days, and on its return proved with young: it produced nine, of a deep brown colour, more resembling the Fitchet than the Ferret. What makes the matter more certain," says this author, "is, that Mr. Lewis had no male of this species for it to couple with; neither was there any within three miles, and these closely confined." Buffon's figure of the "Furet Putois" is probably an animal of this mixed breed. Allowing, as there appears no reason to doubt, that in these instances the Ferret bred with the Fitchet, it proves nothing further than the mere fact; and is no more a proof that they are varieties of the same species, than in the case of the Lion and Tiger, or of the Wolf and Dog, which are well known frequently to interbreed. Of the assertion that the breeders of Ferrets have recourse to the Polecat to improve the breed, I can obtain no authentic verification; nor would it, as we have seen, materially affect the question; and there are sufficient distinctive characters and circumstances appertaining to them, to warrant us in considering them as differing specifically. The general form differs in some slight respects. The muzzle of the Ferret is longer and more pointed, the head rather narrower, and the cranium a little higher at the vertex. It is also altogether a rather smaller animal.

One of the most striking arguments in favour of the distinction of the species, however, is the different geographical range which they inhabit. The Polecat is confined to the northern and temperate parts of Europe, enduring a considerable degree of cold without injury, and tracking its prey for miles over the snow. The Ferret, on the other hand,

originally a native of Africa, is so intolerant of cold, as to require artificial warmth even in the southern parts of this country; and if it be exposed to the cold of a moderate English winter, it perishes. The difference of colour, though important as a collateral support to the opinion now maintained, would of itself be of little value, as the change to albinism is not an unusual consequence of a state of domestication.

The Ferret exhibits a considerable degree of tameness, but without any discriminating attachment: it is in fact nothing more than the indifference and absence of fear and anger, which are the result of hereditary dependance upon and association with mankind. It will allow itself to be handled and played with, and in some cases may be suffered to run about the house with impunity, if it be carefully watched and well fed. But all this appearance of innocence and good temper is deceptive; and the Ferret, when tempted by opportunity, and excited by the smell or taste of blood, becomes as savage, and as indiscriminate in its attacks, as the Polecat itself. I extract the following affecting anecdote from the second series of Jesse's delightful Gleanings in Natural History; and I have felt desirous to make the fact as public as I could, with the view of cautioning persons against that careless confidence in the tameness of this sanguinary and deceitful animal, which has led to more than this instance of the resuscitation of its inherent though dormant propensity for blood.

“Some few years ago, a poor woman, holding a mangled infant in her arms, rushed, screaming with agony and fright, into my friend's house, who is a surgeon, imploring him to save the child's life, who, she said, had been almost killed *by a Ferret*. The face, neck, and arms, were dreadfully lacerated, the jugular vein had been opened, as also the temporal artery; the eyes were greatly injured, and indeed the child,

who is still living, has lost the entire sight of one of them, and has very imperfect vision in the other. Having stopped the still bleeding vessels, my friend accompanied the mother to her cottage, on entering which the child, in some degree recovering from its state of apparent death, began to cry, when the Ferret was in an instant seen rushing from behind some bavins where he had taken shelter, and, with his head erect, boldly came forward and met the infuriated parent in the middle of the room, still holding the infant in her arms. On my friend's kicking the Ferret, as the first impulse of protection, the animal endeavoured to seize his leg, and not until his back was broken by repeated kicks, did he give over his earnest and reiterated attempts to renew his sanguinary feast ; and indeed, whilst in the agonies of death, the piteous screams of the child seemed to rouse him to vain efforts to regain his prey. The Ferret was of large growth, and much distended with the infant's blood ; and although formerly of peculiar shyness, yet he lost sight of fear, and became ferocious in the pursuit of the unfortunate infant. It appears the poor woman had left her child (about six months old) in a cradle whilst she went to market, when it is supposed the infant's cry had arrested the attention of the Ferret, who managed to make his escape, and thus effected his purpose. There is good reason to believe he must have passed more than half an hour in the indulgence of his appetite, from the circumstance of the neighbours having heard the piercing shrieks of the child for a long time without the slightest suspicion of the mother's absence."

This combination of docility and ferocity has, however, rendered the Ferret subservient to the use of man, by enabling him to employ the animal with great advantage in the capture of Rabbits, and in the destruction of Rats and other vermin. In the pursuit of Rabbits it follows them into their

burrows, from which it drives them into nets spread for the purpose. But it is necessary to muzzle the Ferret; for if this be neglected, it attacks and kills the Rabbits, and, after satisfying its ravenous appetite, goes to sleep at the bottom of some burrow, from whence it emerges only in pursuit of fresh prey, and will often take up its abode in the midst of the surrounding plenty till its delicate frame falls a victim to the first frosts of winter. Some wretches are in the habit of sewing up the animal's mouth instead of putting on a muzzle!

The following method of coping the Ferret is given in the Dictionary of Sports:—"A piece of soft string, not too thin, is tied round the neck of the Ferret, close to the head, leaving two longish ends; another piece of string is tied round the under jaw, passing it under the tongue, and brought round over the upper jaw, and tied there, leaving the ends long. This will keep the mouth closed. The four ends are then brought together, and tied in one knot on the top of the head, which makes all safe from slipping. It gives the animal no pain, as they appear to hunt as eagerly as without a muzzle."

The female has two broods in the year, each consisting of from six to nine. She not unfrequently devours her young as soon as they are born; in which case she usually has another brood immediately.

The Ferret was well known to the ancients. Strabo mentions its importation from Africa into Spain, from whence it spread to the other countries of Europe; and Pliny informs us* that in his day it was much used in hunting and taking Rabbits. "*Magna propter venatum cum viverris gratia est; injiciunt eas in specus, qui sunt multiformes in terra; atque ita ejectos, supernè capiunt.*"

The name of Ferret may be derived, dropping the first

* Plin. Hist. Nat. lib. VIII. cap. lv.

syllable, from the Latin *Viverra*; from which is also probably taken the German *Fret*, *Frettel*: whilst the French *Furet*, and the Spanish *Huron* and *Furam*, are taken from *Furo*, which is derived from *Fur*, a thief.

The colour of the Ferret is yellowish, with more or less white in different parts, arising from the long fur being partly white, whilst the shorter is almost wholly yellow. The eyes are pink. The variety already mentioned as the *Furet Putois* of Buffon, which is probably the mutual offspring of the two species, has the general colour of the Polecat, but it is much lighter, and has similar white marks about the mouth. Dimensions:—

	Inch.	Lines.
Length of the head and body	14	0
„ of the head	2	6
„ of the ears	0	6
„ of the tail	5	6



CARNIVORA.

MUSTELIDÆ.

Genus, *Martes*. (Ray.)

MARTEN.

Generic Character.—Grinding teeth $\frac{3}{8}$: $\frac{3}{8}$; body much elongated; feet short, with separate toes; tongue smooth.

COMMON MARTEN.

MARTERON, MARTERN, MARTLETT, STONE MARTEN,
BEECH MARTEN.

Martes foina.

Specific Character.—Brown; throat and breast white.

Mustela martes, var. *guttura albo*, LINN. Syst. Nat. I. p. 67.

„ *foina*, GMEL. LINN. Syst. Nat. p. 95. DESMAR. Mammal.
p. 182. JENYNS, Brit. Vert. p. 11.

Martes fagorum, RAY, Syn. p. 200. FLEM. Brit. An. p. 14.

„ *Saxorum*, KLEIN, Quad. p. 64.

La Fouine, BUFFON, Hist. Nat. VII. p. 161, t. xviii.

Martern, *Marteron*, MERRETT, Pinax, p. 167.

Marten, PENN. Brit. Zool. I. p. 92, No. 13, t. vi. SHAW, Gen.
Zool. I. p. 409.

THE generic separation of the Weasels from the Martens appears to be perfectly justified by their habits no less than

by their structure. Exhibiting the carnivorous and sanguinary propensity in an extreme degree, and confined principally, though not exclusively, to the ground for their accustomed habitation as well as for their food, the whole of the true Weasels possess a still more elongated body than the Martens, with shorter ears and tail, and a closer fur: they have also fewer false grinding teeth, by one on each side, both of the upper and lower jaw. The Martens, on the other hand, reside chiefly in trees, and their structure is admirably suited for such haunts. Creeping from branch to branch in silent and stealthy pursuit of Birds, Squirrels, and other small animals, their sharp and long claws afford them a firm and secure hold of the bark, whilst the long and somewhat bushy tail must considerably aid them in maintaining their balance on the boughs; the ears too are large and open,—a circumstance which is of great advantage to them in discovering and pursuing their prey, amidst the dense foliage in which they love to conceal themselves; and, upon the whole, the typical structure of the Martens is evidently intended to fit them for living in trees, whilst that of the Weasels is as obviously suited for the pursuit of animals not only on the ground, but in the burrows and other subterranean retreats to which their peculiar prey resorts.

It is, however, true that the animals belonging both to the one and the other of these forms, occasionally deviate from the habits which more particularly belong to them. Many of the Weasels are known at times to resort to trees in pursuit of the smaller birds, and especially for the purpose of attacking their nests, from which they devour both eggs and young; whilst the Martens often descend to the ground and destroy not only Mice, Rats, Moles, and other small quadrupeds, but Rabbits, Hares, and, as it is asserted, even Lambs. They are very destructive to game of every kind, and to all

sorts of domestic poultry, from the pigeon to the turkey. It has also been stated that in Scotland the Marten, as well as the Fox, will descend to the sea-shore at low tide, and carry off numbers of the large muscle, *Modiola vulgaris*, to feed upon them.

There are few groups in the whole class of quadrupeds which offer more stubborn difficulties to the zoologist, as regards the discrimination of the species, than the Martens. Agreeing not only in the more essential generic characters, but in the general tone and arrangement of the colours, it is very difficult to ascertain, especially with the two British Martens, whether they constitute varieties only, or whether they really possess distinctive specific characters. Albertus Magnus, followed by Agricola, Gesner, and Aldrovandus, have all treated of them; though, with the exception of Agricola, they throw but little light upon the present question. He indeed describes them as distinct, and assigns to them the same differences in habit, as have since been attributed to them by Buffon. But Linnæus did not recognise the distinction; and it is only in the last edition of his *Systema Naturæ*, that he appears even to have been aware of the variety. "Varietas duplex rusticis," he observes; "Fagorum gutture albo; Abietum gutture flavo." Klein and Brisson revived the former opinion of their being distinct; and although Daubenton, with the caution of an accurate observer of nature, and sincere lover of truth, acknowledges his doubts upon the subject, Buffon embraces and maintains their distinctness with his accustomed sacrifice or distortion of facts, apparently only to afford him an opportunity of displaying the usual eloquence of his comparisons or contrasts. Pennant takes the same view, in which he has been followed by subsequent British faunists. My valued friend Edward T. Bennett, Esq. the accomplished secretary of the Zoological Society,

has drawn up an interesting and very lucid statement of these various opinions, and the grounds on which they have been maintained, in his usual masterly manner, including in this comparison the Sable, which future observations may perhaps prove to be merely a variety of the Pine Marten.*

A deliberate consideration of these and other authorities, and a comparison of many specimens of both kinds, have hitherto failed to lead me to a conclusion at all satisfactory to my own mind; and it is only with the precaution of a protest against being considered as decidedly supporting the opinion that they are essentially different, that I venture to give them a distinctive character in the present work. I am not the more disposed towards this opinion by the observation of two living specimens in the Surrey Zoological Gardens—in which the throat, though decidedly yellow, is less bright and deep in its hue than in some other specimens—and of a single one in the menagerie of the Zoological Society, also living, the throat of which, though it would be termed whitish, yet has a slight yellow tinge. The dark colour of the former, and the lighter and greyer hue of the latter, with the different colour of the throat, joined to a slight difference in the form of the head, the former being proportionally a little longer, would certainly lead us to consider the former as the yellow-throated, or Pine Marten, and the latter as the white-throated, or Beech Marten, supposing them to be dis-

* At the very hour when the author was writing the above sentence, the sanguine hopes which a sudden improvement in Mr. Bennett's health had raised were at once crushed; and friendship and science have to mourn together a loss which can scarcely be repaired. This excellent person was alike distinguished by the extent of his information, the solidity of his judgment, the affectionate sincerity of his heart, and the high unflinching rectitude of his life. Under a retiring and modest exterior, he possessed qualities which might have adorned a far more public and prominent career than his; but loving science and his friends for their own sake, he was satisfied with the approbation of the wise, and the affection of those who enjoyed the happiness and privilege of his regard.

tinged ; but the differences are scarcely decisive, and the yellowish tinge on the throat of the latter specimen shows an approach to the Pine Marten even in this supposed distinguishing character, which is far from offering any help towards a satisfactory solution of the difficulty.

The Beech Marten, or Common Marten, is, in this country at least, more frequently met with than the yellow-throated. There is but little difference in their habits ; they are both of them generally found in the thickest forests, sleeping in the holes of trees ; the present one is, however, seen, more frequently than the other, in places remote from woods, sometimes on the sides of mountains or rocks,—from whence its names of Stone Marten, Stein Marder, *Martes Saxorum*,—where it chooses its retreat in any commodious fissures or excavations. It has now and then been known to take up its abode in the neighbourhood of farms, and to commit continual depredations on the poultry-yard. It is difficult to imagine upon what ground this animal could have been considered as the Pine Marten in a domesticated condition ; yet, we find Buffon gravely proving the contrary by a comparison of the two with the wild and domestic Cat. The present species is in truth as wild as its congener ; and in this respect differs from it only by venturing, with somewhat greater boldness, to the neighbourhood of the habitations of man.

The female makes her nest generally in a hollow tree, but not unfrequently in holes in rocks, sometimes in ruined buildings, or even in granaries and barns : it is formed of straw or grass. She has at least two litters in a year ; some assert four : and the number of young ones at each birth varies from two to seven ; the usual number being four or five.

The aspect and attitudes of the Marten are perhaps more elegant than those of any other of our native quadrupeds. Endowed with great liveliness and activity, its movements

are at once rapid and gracile. Its limbs are elastic, its body lithic and flexible, and it bounds and springs over the ground with equal speed and grace. It is, however, wild and untameable to a great degree, if captured when full-grown, or after a very early age. There is at present a specimen in the Zoological Gardens which is excessively timid and wild: if it be driven from its close box into the outer part of the cage, which can only be done by force, it bounds recklessly from one side to another, striking itself against the wires with great violence. If, however, it be taken young, it is susceptible of great docility; and the remarkable elegance of its form, the beauty of its fur, and the playfulness of its manners, when thoroughly reclaimed, render it one of the most pleasing of pets: neither has it the disagreeable adjunct of that disgusting odour which characterises all the Weasels; for although it has similar scent-glands, the secretion is far from being fetid, and in the Pine Marten is considered by many to be absolutely agreeable. Hence its name of Sweet Marten, in contradistinction to the Fomart (*quasi* Foul-marten), or Polecat.

The fur of this animal is of much less value than that of the yellow-breasted Marten, and bears no comparison with that of the Sable: there are, however, great numbers imported into this country from the North of Europe, and they are frequently dyed and sold as an inferior kind of Sable. The inferiority of its fur consists not only in the colour and actual length, but in the relative length of the longer hair when compared with the inner soft downy hair, which it scarcely conceals; and hence the texture as well as the colour of the fur is much deteriorated. It is known to furriers by the name of Stone Marten. The length and beauty of this fur, as well as of that of most other animals of the kind, is much increased by the accession of cold weather, from climate or

season. Thus the northern skins are more full and of a finer colour and gloss than those from a more temperate climate, and all of them more so in the winter than in the summer.

The head of the Marten is somewhat triangular; the muzzle pointed; the nose extending a little beyond the lips; the eyes large, prominent, and remarkably lively; the ears large, open, and rounded; the body much elongated and very flexible; the tail long, thick, and somewhat bushy; the feet rather short; the toes generally naked, but at times, probably in the winter, covered beneath with a thin soft hair. The fur is of two sorts: the inner, extremely soft, short, copious, and of a light yellowish grey colour; the outer, very long, shining ash-coloured at the roots, brown at the extremity, but of different degrees of intensity at different parts of the body; the middle of the back, the tail, the outer parts of the legs and the feet, being darker than the other parts; the belly lighter and greyer: the throat is white; in one instance I have seen it of a light-yellowish tinge: the inner surface and margin of the ears are also whitish. Dimensions:—

	Ft.	In.	Lines.
Length of the head and body	1	6	0
„ of the head	0	4	0
„ of the ears	0	1	0
„ of the tail	0	9	6



CARNIVORA.

MUSTELIDÆ.



PINE MARTEN.

Martes abietum.

Specific Character.—Brown ; throat yellow : toes naked beneath.

- Mustela Martes*, LINN. Syst. Nat. I. p. 67. DESMAR. Mammal. p. 181,
sp. 280. JENYNS, Brit. Vert. p. 11.
Martes Abietum, RAY, Syn. Quad. 200. FLEM. Brit. An. p. 14.
La Marte, BUFFON, Hist. Nat. VII. p. 190, t. xxii.
Pine Marten, PENN. Brit. Zool. I. p. 94. SHAW, Gen. Zool. I. p. 410.

I HAVE already stated that the distinctions between the former animal and the present, are so inconsiderable, as to leave great doubt whether they constitute more than varieties of the same species. The most striking and obvious differences are those of colour ; but as these appear in some cases at least to be associated with certain slight diversities in size and proportion, and as the habits of the two animals also offer a trifling variation, there appears to be some, though far from satisfactory, ground for considering them as specifically dis-

inct. The Pine Marten is so called from its supposed preference for the forests of those trees, as the former is called by some the Beech Marten, from a similar pretended preference for beech woods. There is, however, no ground for this appropriation of the two species to these different localities. The Pine Marten is certainly attached to pine forests: but it is because the pine forests are abundant in those places which, for climate as well as for the production of its food, are most suited to its wants and habits.

In these it differs but little from the former. It appears to be much less frequently met with, at least in this country; which arises not only from its retiring to more remote and unfrequented places, such as the depths of forests, shunning the neighbourhood of man, and retreating before the advance of cultivation,—but perhaps also from the alleged circumstance of its producing not more than half the number of young. It is equally agile, equally destructive to birds and the smaller animals, equally or still more timid and wild.

The female makes her nest of moss and leaves in the hollow trunks of trees, or usurps that of the Squirrel or the Woodpecker. The number of young ones at a birth is stated to be usually but two or three;—a circumstance which, if correct, would go far towards the decision of the question, as to the relation in which the two animals stand to each other.

The principal structural differences between them consist of the greater length of the legs and the smaller head which characterise the Pine Marten. The fur too is much more abundant, of a finer and softer texture, and of a much richer colour; and is consequently more highly valued, though it is not nearly equal to that of the Sable.

In the essay which I have quoted before, by Mr. Bennett, on the comparison of the Common and Pine Martens and

the Sable, that gentleman has shown, with his usual acumen and extensive knowledge, the difficulties which exist in separating the Sable from the present species. The colour of the fur is scarcely a tangible or satisfactory distinction, for different individuals of the former species vary quite as much in this respect as the Pine Marten and the Sable : the existence of fur on the toes, which has been adduced as a character of the Sable, probably depends on climate, and it is mentioned by Pennant as having been observed by him in the Common Marten. Never having seen an undoubted whole specimen of the true Sable, I am unable to offer any satisfactory addition to our knowledge on the more important characters of the two animals; but I have found, in the examination of numbers of the finest Sable skins, that the yellow patch on the throat had always an irregular outline, and that there were also small spots of the same fine colour scattered on the sides of the neck. This is a distribution of the colour which I have never observed either on the Common or Pine Marten. I offer the fact, however, merely as one which, combined with other characters, may possibly aid in determining the question when we have fuller information on the subject.



CARNIVORA.

FELIDÆ.

Genus, *Felis*.

CAT.

Generic Character.—Grinding teeth $\frac{4}{3}:\frac{4}{3}$. No tubercular grinder in the lower jaw; tongue armed with recurved horny papillæ; claws retractile.

WILD CAT.

Felis catus. Linn.

Specific Character.—Yellowish grey, with a dark longitudinal stripe along the back, and numerous obscure transverse stripes on the sides; tail of equal thickness throughout, less than half the length of the head and body, grey, annulated, and tipped with black.

Felis catus, LINN. *Fd. Suec.* 9.—*Syst. Nat.* I. p. 62. 6. DESMAR. *Mam.* p. 232, sp. 366. TEMM. *Monogr.* p. 126. FLEM. *Brit. An.* p. 15. JENYNS, *Brit. Vert.* p. 14.

Felis sylvatica, MERRETT, *Pin.* p. 169.

Chat sauvage, BUFFON, *Hist. Nat.* VI. t. i.

Wild Cat, PENNANT, *Brit. Quad.* I. p. 81.

Common Wild Cat, JARDINE, *Felinæ*, p. 248, t. xxix.

It is impossible to take even the most casual view of the form and structure of the family to which the present animal

N

belongs, without recognising at once their perfect adaptation to the strongest carnivorous habits. The lithe and agile body; the light, yet powerful limbs; the retractility of the claws; the firm fibre of the muscles; the short jaws, restricted to a simple vertical motion, and furnished with few, but strong and trenchant teeth; offer altogether a combination of characters, all tending to fit these animals for the pursuit and destruction of living prey, to a degree which points them out as constituting the typical group in that division of the mammiferous quadrupeds, which are nourished by animal food. Even the Weasels, sanguinary as they are, and with a conformation fitted for the capture and destruction of the smaller animals, yet exhibit in the general structure of the organs of motion—in the number, strength and form of their teeth, and in many other particulars, a deviation from the type, a weakness and indecision in their zoological characters, which place them below the Cats in the intensity and force of their carnivorous propensity. If the perfection of organisation in an animal consist in the completeness of its adaptation to that animal's habits, then all the forms, innumerable and varied as they are, which crowd before us to attest the immensity and grandeur of creative wisdom, are alike perfect; but this adaptation is certainly most striking and obvious, in those prominent and typical groups which stand out as the landmarks of zoological classification,—the centres, as it were, of the complicated system of creation.

The Wild Cat is the only species of the family which is indigenous to the British Islands. In earlier times, when woods and forests covered many parts of the kingdom, which are now reclaimed and devoted to agriculture, the Wild Cat was much more generally distributed over the face of the country; but it is now almost entirely restricted to Scotland, some of the woods in the north of England, the woody

mountains of Wales, and some parts of Ireland. Their favourite places of resort are the most inaccessible mountainous woods, where they retreat not only to hollow trees, or the depth of thickets, but to concealed fissures of rocks, in which they seek their safety and repose, and bring forth and rear their young.

In stating the localities and estimating the numbers of this species, it is necessary to guard against confounding with it the numerous instances of escaped Domestic Cats, returning to a state of almost absolute wildness, breeding in the woods, and feeding on birds and small quadrupeds. These, though far less powerful than the true Wild Cat, are very destructive to game of every description ; and, still retaining some traces of their old domesticity, they often revisit the farm-yard, and carry off the poultry. The assertion, so often repeated, that the Wild and the Domestic Cat will breed together, I believe to be absolutely without foundation ; and in the account of the latter will be found my reasons for this doubt of the truth of the oft-told story.

The disappearance of the Wild Cat from the districts where it was once so common, is not to be attributed exclusively to the destruction of the woods which formed its resort ; but rather, in many parts, to the introduction of the fowling-piece in place of the primitive means of destruction known to our forefathers : for, although it was formerly considered a beast of chase, yet the great facility with which it climbs trees, and could thus escape from the pursuit of the Dogs, must have much restricted the extent of its destruction ; but in the present day, when such shifts will no longer avail, it falls so surely before the gun of the gamekeeper or the forester, as to threaten its extermination at no very remote period.

The strength and fierceness of this species are such as to

render it an adventure of no trifling annoyance, and even of some danger, to come into close quarters with it, especially when exasperated by a wound. It is no pleasant affair to encounter an enraged male Cat even of the domestic race; the strength and sharpness of his claws, and the length and power of his canine teeth, combined with a fierceness and rage which render such weapons doubly formidable, constitute him an opponent of no ordinary importance: but the Wild Cat is still more to be dreaded from the greater size, power, and ferocity, by which it is characterised. Hence Pennant designates it as the "British Tiger."

The female is considerably smaller than the male. She forms her nest either in hollow trees, or more commonly and more safely in the clefts of rocks; and has even been known, as Sir William Jardine says, to usurp the nest of some large bird as her own. She usually brings four or five young.

The Wild Cat is found throughout the whole of those countries of Europe in which extensive forests exist, especially in Germany, and in all the wooded climates of Russia, Hungary, and of the north of Asia; these are of larger size, and their fur is longer and held in much higher estimation than that of those inhabiting warmer latitudes.

The head of the Wild Cat is triangular, strongly marked; the ears rather large, long, triangular and pointed; the body strong, and rather more robust than that of the Domestic Cat; the tail of equal size throughout its length, or rather larger towards the extremity. The fur is soft, long, and thick; the colour of the face is a yellowish grey, and a band of black spots towards the muzzle; the whiskers are yellowish white; forehead brown; the head grey, marked with two black stripes passing from the eyes, over and behind the ears; back, sides and limbs grey, darker on the back, paler on the sides; with a blackish longitudinal stripe along the middle of

the back, and numerous paler curved ones on the sides, which are darker towards the back, and become obsolete towards the belly, which is nearly white. The tail is annulated with light grey and black, and the tip is of the latter colour; the feet and insides of the legs are yellowish grey; the soles of the feet are black, at least in the male, of which sex Temminck declares it to be a peculiarity: the colours of the female are altogether paler, and the markings less distinct.

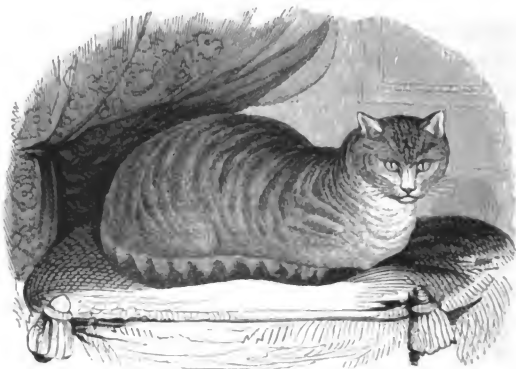
The dimensions of the Wild Cat differ greatly, if we take the statement of various naturalists. The medium size of the full-grown male is as follows; the female being always rather smaller:—

	Feet.	In.	Lines.
Length of the head and body	1	10	0
„ of the head	0	3	8
„ of the ears	0	2	3
„ of the tail	0	11	2



CARNIVORA.

FELIDÆ.



DOMESTIC CAT.

Felis ——?Var. *domestica*.

Specific Character.—Tail about half the length of the head and body, tapering to the extremity.

Felis catus domestica, AUCTORUM.

Chat domestique, BUFFON, Hist. Nat. VI. t. ii. iii. iv.

Domestic Cat, PENN. Brit. Zool. p. 82.

THE question of the real origin of our Domestic Cat involves the consideration of several subjects of much interest. The existence of a species of about the same size, and with colours and markings which are nearly imitated in some individuals of the domestic race, indigenous to our own country, and to many parts of the Continent of Europe, has given rise to an opinion so universal as to have been

scarcely ever called in question, that the common Wild Cat is the original form, from which all our Domestic Cats have sprung. There are, however, many reasons for believing that this opinion is entirely erroneous. In the first place, the general conformation of the two animals is considerably different, especially in the length and form of the tail, which in the Wild Cat is strong, robust, and at least as large towards the extremity, as at the base and middle; whilst that of the Domestic Cat tapers towards the apex. The fur too of the former is thicker and longer; and although the colours are somewhat like those which occur in some individuals of the ordinary species, there are, even in this respect, distinctions which can scarcely be considered otherwise than as essentially specific; as, for instance, the termination of the tail in a black tuft, which invariably marks the Wild Cat.

But, it may be asked, if they be not of the same species, how comes it that they so often breed together, and produce fertile young? How is it that the female Tame Cats wander from home into the woods, and return pregnant by the Wild Cat? But, on the other hand, is it so certain that this long-received notion is a true one? The names of Buffon, of Pennant, and of almost every naturalist who has written on these animals, are indeed sufficient to call for a very careful investigation before we conclude against such authorities; and it is not without much reflection on the matter that I have come to the conclusion that this opinion of their intermixture, repeated and transmitted from one to another, till it has become an uncontested dogma, is erroneous, and has its foundation in mistaken facts. For, after all, what are the facts themselves upon which it is founded? Simply, that a female Domestic Cat has been occasionally known to leave her home in the neighbourhood of woods, said to be frequented by the wild species, and returned with young. No

one pretends to have ascertained by actual observation, the paternity of such litters; and it is quite as reasonable to suppose that the father in such cases may be some stray Cat of the Domestic breed, which has resumed a half-wild state in the woods. It is well known that the attachment of the Domestic Cat to its native home is not always sufficiently strong to prevent it from wandering in search of birds, and other wild food, which it may obtain in woods and forests; and every gamekeeper and every sportsman in such neighbourhoods is well aware that in numerous instances they never return to their former state of domestication, but breed and rear their progeny in a state as wild as that of their original progenitors could have been. It is therefore more probable, even from the facts, and far more consistent with what is now known of the distinctions between them, to attribute the fecundity above mentioned to the agency of one of these rather than of the true Wild Cat.

It may, however, be farther urged, that the striped or tabby variety of the Domestic Cat frequently exhibits markings so similar to those of the Wild Cat, as to afford a strong presumption of the admixture of the two races, if not of their absolute specific identity. To this it may be answered, that in most domesticated animals, colour becomes of little value as a guide to their wild original. The greater number of the present genus, too, have a decided indication of a striped character in the markings of the body; even the Lion, when very young, showing distinct stripes on the sides. The species from which the Domestic Cat has sprung, may have a tendency at least to a similar kind of pattern of the fur: besides, to show how little dependance is to be placed on colour in such cases, the Tortoiseshell Cat is, I presume, universally admitted to be derived from the same race as the Tabby; yet the distribution of the colours is to-

tally different, and there is no species known in the wild state which bears the slightest resemblance to that particoloured variety.

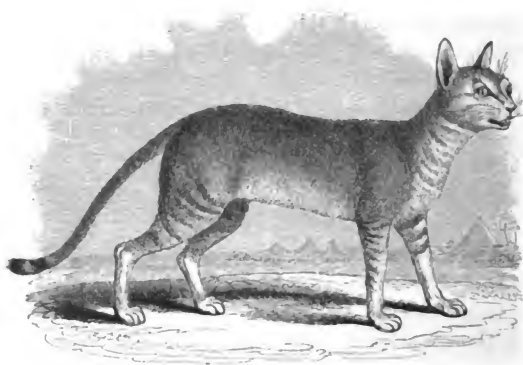
Having thus disposed of these, the only facts on which this opinion is based, it becomes a matter of no small interest, to ascertain whether there be or not some other species of Cat, still existing in a state of nature, to which our domestic races owe their origin.

The most obvious means of arriving at a probable conclusion on this point, would be, first of all, to ascertain where the most ancient allusions to the existence of a Cat in a domestic state, may be found in any historical documents; and its not unfrequent occurrence in sculptures and paintings of high antiquity, amidst the remains of the ancient Egyptians, as well as the existence of its mummies in their tombs, would appear to supply this desideratum; and at once point to that country, as the probable locality in which the original breed is to be sought.

Led doubtless by these indications, the discovery of a new species of *Felis* in Nubia, by the celebrated traveller Rüppell, which is of about the same size as our Domestic Cat, and having several characters in common with it, induced Temminck to conclude that in this species is to be found the true original of that animal. The deservedly high authority of this naturalist has led all subsequent writers on the subject to adopt the same conclusion; but, as it appears to me, hastily, and on insufficient grounds. One of the most obvious distinctions between the British Wild Cat and the Domestic, is the difference in the length and thickness of the tail; and in its being taper in the latter, whilst in the former it is quite as thick, if not thicker, at the extremity than at the base: but in *F. maniculata* there are distinctions in this part no less striking than in the former case; the tail

in M. Rüppell's species being much longer in proportion, than is ever seen in the domestic race; and, although somewhat slender in the greater part of its length, it terminates in a thickened and tufted extremity. The ears too are much longer and broader, and the legs longer and more slender.

Upon the whole, I cannot but come to the conclusion that the species to which the high authority just mentioned has assigned the origin of our House Cat, is still further removed from it in essential zoological characters than even the British Wild Cat, to which it had been previously so generally referred; and that, as in the case of so many of our domesticated animals, we have yet to seek for the true original of this useful, gentle, and elegant animal.



I insert here a reduced copy of Rüppell's figure, to afford an opportunity of comparison, to those who have not the original work to refer to. There is also a very good coloured copy of the same figure in Sir William Jardine's entertaining

volume on the *Felidæ* ; in which work the arguments in favour of the opinion of Temmiuck are fairly and luminously stated.

The character of our Domestic Cat has been much vilified and maligned. If we are to believe the description given by most writers of this too often ill-treated and persecuted animal, its great utility is but as dust in the balance when placed against the danger and annoyance of its faithless, malicious, but fawning and flattering disposition. According to such writers, it is cruel, sly, without discriminating attachment, gentle only from artifice, and fawning but to betray. In short, an incorrigible thief, an irreclaimable savage, a faithless friend, and a dangerous playmate are all included in the character of the Cat, which, drawn by Buffon, has been copied with only varied expressions of dislike by his numerous imitators. Now, without holding it up as a parallel with the Dog, or attributing to it the dignified sagacity, the unchanging faith, the warm and discriminating affection, and the almost human docility of that friend and companion of man, we may with perfect fairness declare, that a more gross misrepresentation can scarcely be found, than that contained in the description of the Cat, by the eloquent author just mentioned. How often do we see them evincing a marked and paramount attachment to their master, running to him from a distance to welcome his approach, walking by his side with every mark of delight at his return, and showing a degree of restless anxiety when he is absent ! Who has not heard of the favourite Cat that watched by the couch of its dying master, that after when life was extinct could scarcely be driven from the room where his corpse remained, and after his interment, though repeatedly driven and carried from the churchyard, was seen to return to the grave, on which it would lie for hours, regardless of cold, and unmindful of the

cravings of hunger? It is true that such instances as this are and must be rare ; but every one who has treated a Cat with great kindness and gentleness, will acknowledge how false is the picture drawn by its prejudiced enemies.

It would indeed be easy to fill a volume, and it would be far from an uninteresting one, in proof of the susceptibility of the Cat for gentle affections and individual attachment, not only to mankind, but to their own race, and even to other animals. Of the latter, Mr. Jesse gives a delightful anecdote in the second series of his interesting "Gleanings." A Cat which had lately had kittens, all of which, excepting one, had been destroyed, exhibited a perfectly maternal attachment to a Mouse, which used to come running to her from its hiding-place, as soon as puss entered the parlour, and would lie down on the rug with her, in the very attitude of sucking, receiving the caresses of this mighty and unwonted friend. The poor Mouse, however, fell a victim to its confidence in its kind nurse ; for, on seeing another Cat enter the room, it ran towards it, and, not discovering its fatal mistake till too late, it was instantly killed and devoured. Its poor friend, thus again bereaved, evinced the most lively regret at its loss, wandering about the house with every demonstration of uneasiness and distress. "What rendered the anecdote the more extraordinary," continues Mr. Jesse, "is the fact of the Cat being an excellent mouser ; and that during the time she was showing so much fondness for this Mouse, she was preying upon others with the utmost avidity." I had a Cat which made a playfellow of a half-grown Rabbit ; and it was very amusing to see these two incongruous animals romping together, turning each other over and over, and, in short, playing with perfect good will and the most thorough good temper.

The habits then of this useful creature are usually gentle,

quiet, and even affectionate. At times, however, though but rarely, it must be confessed that this picture is sadly reversed; and even the fondest of the race will play till the excitement becomes so great as to overcome their accustomed tameness, and in the midst of their gambols, they will suddenly spring upon the hand that has been rubbing and fondling them, and bite and scratch it with great fury.

Cats are very observing creatures, exploring an apartment to which they are newly introduced with great care and accuracy, until they have familiarised themselves with every part of it. They are fond of warmth, lying as close as possible to the fire during the winter. Their sleep is proverbially light, and is disturbed by the slightest noise;—a faculty which is of essential advantage to them in the wild state, and which they partake with most other species of the genus. When caressed, they express their satisfaction by the utterance of a soft grumbling sound, called purring, the production of which depends upon some peculiar action of the organs of voice, not yet satisfactorily explained. When suddenly disturbed or attacked, they raise their back and show their teeth, the hair stands out from the skin, and the tail then becomes more than twice its ordinary thickness; and when angry, they utter a harsh discordant growl. They exhibit the most violent fondness for certain strong-smelling plants, such as catmint and valerian; and will lie down and roll themselves in the latter, until they seem almost mad with the excitement which the odour produces upon them; foaming at the mouth, and with the saliva running from the lips. They are very cleanly; concealing with great care their excrement in the earth, by scraping a hole for its reception, and carefully covering it afterwards.

The utility of the Cat as a destroyer of those domestic annoyances, Rats and Mice, is too well known to require more than this allusion. It seldom eats any of the Rats

which it kills, excepting very young ones. Notwithstanding this, a good Rat-catcher will watch with the most indefatigable patience for hours together at a Rat's hole; and there are instances even of their overcoming their natural dread of water, and plunging into a pond or a ditch infested with those animals, and bringing out several of them in the course of a day. A well-bred and kindly-treated Cat, when she has taken a Rat, will often trot off with it in her mouth, and bringing it to her master or mistress, or to a favourite servant, lay it down at her patron's feet, and look up with mingled pride and affection, mewling most intelligibly for the accustomed caress of approbation.

The dread which these animals evince of water, and their fondness for fish, appear to be incongruous propensities; yet we find that the latter taste is sometimes sufficiently powerful to induce a Cat to "wet her velvet feet," and to seek her favourite food within its natural element. Cats, too, exhibit the same instinctive power to find their home after having been carried to a distance, as we so often remark in Dogs; and they will even cross rivers to return to their accustomed habitation.

The cry of the Cat at particular periods is so loud, harsh, and wailing, as to be at once disgusting and terrific; and in their conflicts they seem to reassume all their original savage ferocity, biting and tearing each other in a frightful manner, and making the neighbourhood ring with their hideous yells. The female has two or three litters in a year; she goes with young about fifty-six days, and generally produces five or six at a birth. Her attachment to her young is as strong as that of most other animals, but not always perfectly discriminating. White relates the circumstance of a Cat, which, having lost her kittens, brought up three young Squirrels, suckling them with the same assiduity, and clean-

ing and tending them with the same tenderness as if they had been her own young ; and Rats have more than once been successfully placed to the teats of a Cat under similar circumstances. I well remember, that, when I was very young, a venerable friend of mine, a clergyman in Dorsetshire, possessed two beautiful Tortoiseshell Cats, which were sisters, and had kittens at the same period, and in the same box ; and I have often seen each of them suckling either of the two litters indiscriminately. The playfulness of the kitten is proverbial.

There are several more or less distinct varieties of the Cat, of which the most marked are the Tabby, the Tortoiseshell, the Chartreuse of a bluish colour, and the long silken-haired Angora. The Tabby may probably be considered as approaching most nearly to the original type ; it varies exceedingly in the number and form of its markings, and in the ground colour of the fur. Individuals of this race are not unfrequent, which are of a fine deep black colour, in which the stripes of the sides may be discerned of a still more intense hue.—The Tortoiseshell variety is stated to have been originally brought to this country from Spain. The colours consist of fulvous, black and white, variously interspersed. A male with the irregular markings which are so common in the other sex is so rare, that enormous sums have occasionally been offered for them. It would appear that those males which have a buff fur with stripes of a darker shade of nearly the same hue, are to be considered as belonging to the Spanish variety.

The tailless Cat, of which a considerable number exist in Cornwall and in the Isle of Man, is occasionally found in other places. I have seen it in a little obscure village in Dorsetshire, where it was rather numerous, but all of them had sprung from the same stock ; and it was traditional there

that they had been derived from one which had lost its tail by accident. This opinion is much confirmed by a fact recorded in Loudon's Magazine, of a Cat to which such an accident occurred, and which always had two or three tailless kittens in every subsequent litter.

There is also a white or whitish Cat, with light blue eyes, which is stated by Shaw and other authorities to be always deaf. Of this, instances are related in the first volume of that excellent repertory of interesting facts in Natural History just quoted. There are many other varieties preserved in different countries and climates, but all probably descended from one common origin.

Of the ancient history of the Cat in this country, and especially of its first introduction here, little is positively known. Amongst the laws of the good old Welsh prince Hoel dda occur probably the first detailed notices of its existence and utility. From the value then placed upon it, and the care which is taken to fix accurately its price, and to prevent imposition in the sale of it, it cannot be doubted that it was rare, and probably had been but a short time introduced into this country. A penny for a kitling before it could see, which was doubled from that time till it caught a Mouse, and quadrupled for a mouser, were very high prices if we consider the relative value of money at that period. A person who had stolen the Cat that guarded the prince's granary "was to forfeit a milch ewe, its fleece, and lamb; or as much wheat as when poured on the Cat suspended by the tail, (the head touching the floor,) would form a heap high enough to cover the tip of the former."*

It is difficult to treat of this animal without making some allusion to the old story of Whittington and his Cat, about whom so much has been said and sung. The true founda-

* *Leges Wallicæ*.—Penn. I. p. 83.

tion of the story is, however, involved in much obscurity. It is remarkable that a similar narrative is to be found in most of the countries of Europe, and in some Asiatic nations, particularly Persia ; and there are many who are disposed to believe that the venture from which the fortunes of that immortalised chief magistrate sprung, was in truth nothing more than the freight of a vessel of that kind which in former times was called *catta* or *gatta* ; and that all the interest of this romantic little history depends upon a simple equivocal. I cannot, however, bring myself to throw down at once all the delightful associations which spring in the mind of every child, and of many of a larger growth, at the mention of Whittington and his Cat ; nor, without more certain grounds, to demolish all the romance of that pleasing and popular story. As long as the adventures of Whittington are held up as an example of successful probity by the honest citizen, sung by the poet of childhood, or painted by such a pencil as Leslie's, let his Cat still share her master's renown, and contribute to the interest and effect of the legend.



CARNIVORA.

CANIDÆ.

Genus, CANIS.

Generic Character.—Grinding teeth $\frac{5}{5}$; tongue smooth; pupils circular; claws not retractile.

THE DOG.

Canis familiaris. Linn.

Canis familiaris, LINN. Syst. Nat. I. p. 56. DESMAR. Mammal. p. 190, sp. 292. FLEM. Brit. An. p. 10. JENYNS, Brit. Vert. p. 13.
Chien, BUFFON, Hist. Nat. V. p. 185.
Dog, PENN. Brit. Zool. I. p. 59.
Common Dog, SHAW, Gen. Zool. I. p. 273, t. lxxv.

THE triumphs of human art and reason over the natural instincts of the inferior animals, are exhibited in various deviations from their original habits, according to the nature, or more properly the corporeal and mental peculiarities, of the animals themselves, and their capabilities of being rendered subservient to the use, the amusement, or the luxury of man. This reduction, not only of their physical force, but of their mental powers, to human authority, differs in degree as well as in kind; for whilst the Sheep and the Hog are brought only so far under his dominion as to yield to him their flesh for his food, and their hides for his clothing, the Horse, possessing a capacity for a far more extended education, is brought into more immediate communication with him, and evinces a degree of docility which renders him the intelligent servant, rather than the brute slave of his master.

But it is in the Dog alone that we find those qualities which fit him for that more intimate association with his conqueror, by which he becomes his friend and companion, whilst still his faithful and humble and laborious servant. In contemplating the character of the different varieties of this valuable animal, it is impossible not to look with admiration, combined with a feeling almost amounting to esteem, at the various qualities of mind and of body which raise the Dog so far above every other; or to reflect without the most kindly and grateful emotions, on the unwearied perseverance, the unflinching courage, the unchanging faithfulness, the affectionate and discriminating attachment, which characterise his relation to mankind.

In the midst of all the interesting associations which crowd upon the recollection on entering upon this extensive subject, it is impossible not to feel that the difficulty of doing it justice, which its very nature implies, becomes magnified into impracticability by the limited extent of the present work. A slight and hasty sketch is all that can be given, where a volume would be required, to comprise even its most essential and important parts.

It is a well-known and remarkable fact, that all the researches of travellers, aided by the strongest lights of zoological science, have hitherto failed to discover or to ascertain the true original of most of our domesticated animals; and in some cases, indeed, there is almost a certainty that they no longer exist in any other state, than as the servants of mankind. It must always be a matter of no inconsiderable interest to endeavour to trace, in the wild condition, the original form and characters of the numerous varieties, under which our domestic animals present themselves; not only as a matter of reasonable curiosity as to the isolated facts, but especially with the view of arriving at some rational theory,

concerning the laws by which variation, as produced by domesticity, is regulated. That such laws do exist, appears highly probable from numerous instances of the constant recurrence of similar phenomena under given circumstances, which seems to preclude their dependance upon mere accident. One of the most striking of these is the fact that, in many species, the successive intermixture of intermediate varieties will always produce at length a return to one or other of the radical forms from which they were descended: that thus, if a pouter pigeon and a fantail be matched and have young, the descendants will, after a few generations, resume the character either of the pouter or the fantail;* and hence, that even varieties cannot be multiplied beyond a certain extent, and certain definite forms.

Without entering further, however, into the consideration of this subject, which, although one of great interest, could hardly be discussed with advantage in this place, it may not be uninteresting to examine what is the real state of the question, as it regards the original form, from which all the numerous varieties of the Dog have sprung. In order to come to any rational conclusion on this head, it will be necessary to ascertain to what type the animal approaches most nearly, after having, for many successive generations, existed in a wild state, removed from the influence of domestication, and of association with mankind. Now we find that there are several different instances of the existence of Dogs in such a state of wildness as to have lost even that common character of domestication, variety of colour and marking. Of these, two very remarkable ones are the Dhole of India, and the Dingo of Australia: there is, besides, a half-reclaimed race amongst the Indians of North America, and another, also partially tamed, in South America, which deserve attention:

* For this fact I am indebted to my friend Mr. Sabine.

and it is found that these races, in different degrees, and in a greater degree as they are more wild, exhibit the lank and gaunt form, the lengthened limbs, the long and slender muzzle, and the great comparative strength, which characterise the Wolf; and that the tail of the Australian Dog, which may be considered as the most remote from a state of domestication, assumes the slightly bushy form of that animal.

We have here then a considerable approximation to a well-known wild animal of the same genus, in races which, though doubtless descended from domesticated ancestors, have gradually assumed the wild condition; and it is worthy of especial remark, that the anatomy of the Wolf, and its osteology in particular, does not differ from that of the Dogs in general, more than the different kinds of Dogs do from each other. The cranium is absolutely similar, and so are all, or nearly all, the other essential parts; and to strengthen still further the probability of their identity, the Dog and Wolf will readily breed together, and their progeny is fertile. The obliquity of the position of the eyes in the Wolf is one of the characters in which it differs from the Dogs; and although it is very desirable not to rest too much upon the effects of habit or structure, it is not perhaps straining the point, to attribute the forward direction of the eyes in the Dogs, to the constant habit, for many successive generations, of looking forwards to their master, and obeying his voice.

A point of very considerable importance in the question of the identity of species is the period of gestation. This circumstance is so invariable in individuals of the same species, and so rarely the same in those which are distinct, however nearly they may be allied, that if, in this respect, two animals be found to differ, it would be a strong ground for doubting at least, perhaps even for rejecting, the opinion of their identity; and, on the other hand, their absolute coin-

cidence on this point would afford a collateral argument of equal force in its favour. Buffon indeed relates an instance of the Wolf, in which the period might possibly have been seventy-three days; but even on his own showing, it might have been no more than sixty-three; and certain circumstances detailed in the account afford strong reason for believing this to have been the case. Hunter, who instituted a series of interesting and, as far as they went, important experiments, in order to ascertain whether the Wolf and the Jackal would respectively breed with the Dog, comes to the conclusion, on finding the affirmative to be true in both instances, that the Dog, the Wolf, and the Jackal are of one species. But he found that the period of the Jackal is fifty-nine days, whilst that of the Wolf is sixty-three days, the same as that of the common Dog. Desmarest also gives sixty-three days as the period of the Wolf. As far as this character goes therefore, it is in favour of the identity of the Wolf and Dog, and of the specific distinctness of the Jackal.

The conclusion which Hunter draws from the fact that each of these wild animals will breed with the Dog, and produce young which are fertile again with the Dog, is, however, not yet satisfactory; and the argument would be much stronger were it proved that the progeny would breed with each other, which has not at present been done. It appears that in many other cases, especially amongst birds, the hybrid will breed with either of the parent species; but the more satisfactory experiment just proposed remains to be tried; and until this has been done, the chain of evidence is incomplete, and the validity of the argument derived from the alleged fertility of progeny is inconclusive.

But, it may be objected, the Wolf is so untameably savage, that it would take ages of domestication to render it even moderately tractable. This, however, is the objection

of those only who have never witnessed the susceptibility of this savage creature of attachment to mankind or to other animals. I remember a bitch Wolf at the Zoological Gardens, which would always come to the front bars of her den to be caressed as soon as I, or any other person whom she knew, approached: she had pups, too; and used to bring them in her mouth, to be also noticed; and so eager, in fact, was she that her little ones should share with her in the notice of her friends, that she killed all of them in succession by rubbing them against the bars of her den, as she brought them forwards to be fondled. But M. Frederic Cuvier relates a more extraordinary instance of affection, as well as of recognition, which would do credit to the most esteemed and fostered of the canine race. The individual in question was brought up as a young Dog, became familiar with every person whom he was in the habit of seeing, and in particular, followed his master everywhere, evincing evident chagrin at his absence, obeying his voice, and showing a degree of submission scarcely differing in any respect from that of the most thoroughly domesticated Dog. His master, being obliged to be absent for a time, presented his pet to the *Ménagerie du Roi*; where the animal, confined in a den, continued disconsolate, and would scarcely take his food: at length, however, his health returned, he became attached to his keepers, and appeared to have forgotten all his former affection; when, after eighteen months, his master returned. At the first word he uttered, the Wolf, who had not perceived him amongst the crowd, recognised him, exhibited the most lively joy, and being set at liberty, lavished on his old friend the most affectionate caresses, as the most attached Dog would have done after an absence of a few days. A second separation was followed by similar demonstrations of sorrow, which, however again yielded to time. Three years

had passed, and the Wolf was living happily in company with a Dog which had been placed with him, when his master again returned, and again the long-lost but still-remembered voice was instantly replied to by the most impatient cries, which were redoubled as soon as the poor fellow was at liberty ; when, rushing to his master, he threw his fore-feet on his shoulders, licking his face with every mark of the most lively joy, and menacing his keepers, who offered to remove him, and towards whom, not a moment before, he had been showing every mark of fondness. A third separation, however, seemed to be too much for this faithful animal's temper : he became gloomy, desponding, refused his food, and for a long time his life appeared in great danger. His health, however, returned ; but he no longer suffered the caresses of any but his keepers, and towards strangers manifested the original savageness of his species. Now, if we find that the mere education of a young Wolf, taken from its parents in a wild state, could so far change its natural disposition, and render it so fond, so intelligent, and so grateful as this, what may we not expect from the successive transmission of improvement by the culture and training of a whole race for ages ?

With all these analogous properties of form and structure, as well as of disposition, I cannot but incline, at least, to the opinion that the Wolf is the original source, from which all our domestic Dogs have sprung : nor do I see in the great variety which exists in the different races, sufficient ground for concluding that they may not, all of them, have descended from one common stock. The Turnspit and the Mastiff, the Pug and the Greyhound, are perhaps more unlike each other than any of the varieties of other domestic animals ; but if it be true that variation depends upon habit and education, the very different employments to which Dogs

have in all ages been trained, and the various climates to which they have been naturalised, must not be lost sight of as collateral agents in producing these different forms. The care, too, with which Dogs of particular breeds are matched with similar ones, for the purpose of keeping the progeny as pure as possible, has doubtless its effect in promoting such distinctions.

That the qualities induced by domestication become more intimately interwoven with the character of the animal by successive transmission from parent to offspring, is a fact attested by the experience of ages, though too often lost sight of in the consideration of this interesting subject. Sir John Sebright has lately published a little work, in which this theory is placed in a very luminous, satisfactory, and interesting point of view; showing, with the clearness and precision which mark the acute and accurate observer, that the qualities by which the different races are distinguished, descend from one generation to another, as characteristic of the race, though originally implanted by education.

“Very different propensities,” says Sir John Sebright, “are found in the various breeds of domestic Dogs, and they are always such as are particularly suited to the purposes to which each of these breeds has long been, and is still applied. The performances of the Shepherd’s Dog, which would seem to be the result of little less than human intelligence, are much too artificial, and too much in opposition to the nature of the animal, to be attributed to instinct; and yet the young Dogs of this breed appear to have a propensity to the performance of these services,—or, as the shepherds say, *a thorough-bred one will take to them naturally*. I do not believe that the same things could be taught to Dogs of other breeds.” After adducing similar instances in the Pointer, the Hound, and other races, for which I beg to

refer to the work itself, Sir John thus concludes : " No one can suppose that nature has given to these several varieties of the same species such very different instinctive propensities, and that each of these breeds should possess those which are best suited for the uses to which they are respectively applied. It seems more probable that these breeds, having been long treated as they now are, and applied to the same uses, should have acquired habits by experience and instruction, which in course of time have become hereditary. From these and many other observations, I am led to conclude, that by far the greater part of the propensities that are generally supposed to be instinctive, are not implanted in animals by nature, but that they are the result of long experience, acquired and accumulated through many generations, so as in the course of time to assume the character of instinct."

These opinions, of the truth of which I have long felt persuaded, come with redoubled effect from one so well known as Sir John Sebright, as an acute, sensible, practical observer, and one whose judgment can well be relied on, in generalising on those facts with which his long experience and observation have furnished him.

Upon the whole, the argument in favour of the view which I have taken, that the Wolf is *probably* the original of all the canine races, may be thus stated :—The structure of the animal is identical, or so nearly so, as to afford the strongest *à priori* evidence in its favour. The Dog must have been derived from an animal susceptible of the highest degree of domestication, and capable of great affection for mankind ; which has been abundantly proved of the Wolf. Dogs having returned to a wild state, and continued in that condition through many generations, exhibit characters which approximate more and more to those of the Wolf,

in proportion as the influence of domestication ceases to act. The two animals will breed together, and produce fertile young. The period of gestation is the same.

The effect of domestication in producing variation in colour, to which allusion has already been made, has lately been exhibited in a very striking and interesting manner in the menagerie of the Zoological Society. An Australian bitch, or *Dingo*, had a litter of puppies, the father of which was also of that breed : both of them had been taken in the wild state, both were of the uniform reddish brown colour which belongs to the race, and the mother had never bred before ; but the young, bred in confinement, and in a half-domesticated state, were all of them more or less spotted.

The races of Dogs have at different times been variously classified, according to the views of the respective authors ; but, as it appears to me, with very little truth in a zoological point of view, and as little practical advantage. Although it is obvious that certain varieties approach more nearly to each other in habit and conformation than others, there is not sufficient ground for a regular systematic arrangement. Buffon, Frederic Cuvier, and other authors, have attempted such classifications ; but they have been merely artificial, and in many instances have gone upon erroneous suppositions as to the origin of mixed races. I shall not attempt such a method, but merely enumerate the principal varieties which are bred and employed in this country, in a series which appears to offer but few obvious violations of affinity.

The specific character of the Dog, as given by every zoologist that has hitherto attempted it, is unsatisfactory and incorrect. There is not a single character which belongs to all the varieties, which is not also applicable to the Wolf. Let us take the full definition of Desmarest :—" Tail recurved ; muzzle more or less elongated or shortened ; fur

very various, both as regards the nature of the hair and the colour," &c. What can be more vague and absurd than this? The only positive character, the recurved tail, is as true of the Wolf, and of some other species, as of many of the Dogs; and the remaining characters are absolutely nugatory. With the view which I have taken of the origin of this animal, and the great diversity of the races, I have felt that a satisfactory specific definition is impossible; and I have therefore omitted it altogether.

The food of the Dog is various. It will live on cooked vegetable matters, but prefers animal food, and is particularly fond of it when approaching putrefaction. Its stomach will digest portions of bone. In drinking, it laps with the tongue; it never perspires; but the nose is naked and moist; and when hot, the tongue hangs out of the mouth, and a considerable quantity of water drops from it. It walks round the place it is about to lie down upon, and then coils itself up in the same direction. The female goes with young sixty-three days, and usually has about six or eight at a litter; though sometimes as many as twelve or fourteen. These are blind at birth, and do not acquire their sight until the tenth day. It is commonly stated that the male puppies resemble the father, and the female the mother: this, however, if it be true to a certain extent, is not absolutely so; but, like many other animals, the father of the first litter often produces an impression which is scarcely lost in all the subsequent ones. This is a fact worthy of particular attention, as it bears upon a question of as great interest and importance as any in the whole range of animal physiology.

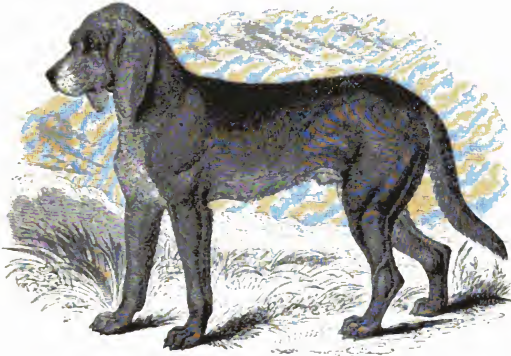
Such are some of the general habits of the whole species; and there are many others which are too well known to require repetition. Those which belong to the different races will be briefly mentioned under the separate heads.

The period at which the domestication of the Dog first took place is wholly lost in the mist of antiquity. The earliest mention of it, in the sacred scripture, occurs during the sojourn of the Israelites in Egypt :—" But against Israel shall not a Dog move his tongue." It is again mentioned in the Mosaic law, in a manner which would seem to show that they were the common scavengers of the Israelitish camp, as they are still in many cities of the East :—" Neither shall ye eat any flesh that is torn of beasts in the field : ye shall cast it to the Dogs." A similar office seems to be repeatedly alluded to in the course of the Jewish history :—" Him that dieth in the city shall the Dogs eat, and him that dieth in the fields shall the fowls of the air eat : " a common curse, as it would appear, as it occurs verbatim on no less than three separate occasions in the First Book of Kings ; and evidently intimates a violent and disgraceful death, without the honours of sepulture. The Dog was considered by the Jews as eminently an unclean animal, and was the figure selected for the most contemptuous insults. It is impossible not to be struck with the striking similarity which exists in the feelings of many Oriental nations at the present day, amongst whom the very phraseology of the scriptures is, with little modification, applied to a similar purpose.

The ancient Greeks, however, would appear to have entertained a very different sentiment towards it. Homer, in his *Odyssey*, employs the faithful attachment of the Dog to his master as the foundation of one of the most touching and interesting incidents in the eventful wanderings of his hero ; and there is not a modern story of the kind, accumulated as such instances have been by the industry of unnumbered collectors of "anecdotes of the Dog," which can surpass—perhaps scarcely equal—the affecting simplicity with which the poor Dog's dying recognition of his long-lost mas-

ter, is related by one who wrote probably not less than two thousand seven hundred years ago. From that time to the present, in all countries where the religious peculiarities of the people have not interposed, the merits of the Dog have been acknowledged and recorded. He has been the pampered minion of royalty, and the half-starved partaker of the beggar's crust: in one form he appears as the high-bred Hound of the chase, in another as the lowly but more useful keeper of his master's flocks, in another as the sure and pertinacious tracker of human felons, in another as the active destroyer of humbler nuisances, and in another as the laborious beast of burthen and of draught.





THE BLOOD-HOUND.

SLEUT-HOUND.

Canis sanguinarius. Ray.

THE different sub-varieties of the Hound, including all the Dogs employed in the chase, which hunt by scent, and have large pendulous ears, would appear, from their near relation to each other in form, and in a susceptibility for an education to particular habits, to have originated in one type. Those which are now known, and of which distinct breeds exist, are the Blood-hound, the old Southern-hound, the Stag-hound, the Fox-hound, the Harrier, and the Beagle; and it is supposed by some authorities that the magnificent animal now under consideration constituted the original breed of Hound in this country, the stock from which the

others have been successively derived. Whether this be the case or not cannot now be ascertained ; but there is no doubt that it is of very ancient use in England, and was probably the Talbot of the sportsmen of olden time, though that name appears to have been afterwards indiscriminately applied to Hounds of other breeds also. The qualities for which it has acquired so high a reputation, are the acuteness and certainty of its scent, and the pertinacity and sagacity with which it will track any object to the pursuit of which it has been trained. This propensity, originally made subservient only to the usual objects of the chase, has, in subsequent ages, been applied to the purpose of tracking felons, or to the more odious task of discovering political and belligerent fugitives. In this occupation, the intelligence, acuteness, and determined purpose which these animals evinced, were almost incredible ; and numerous instances are recorded in which, after the lapse of a considerable time, the Sleut-hound, being put upon the scent, followed the wretched fugitive for hours, and even days, with a searching and unflinching pertinacity, which at length overcame all impediments, and ensured the capture of his unhappy quarry.

For such purposes as these, the Blood-hound has been employed at various times, in every part of the United Kingdom : in the clan feuds of Scotland, in the border contests of the debatable land of the two kingdoms, and in the unhappy Irish rebellion, its extraordinary powers have been taken advantage of without much regard to the claims either of justice or of mercy. Such scenes, however, have now become mere matter of history and of tradition : for, on the one hand, the improvements which have taken place in the breed of Hounds for the purposes of the chase, and on the other, the gradual introduction of a more regular system of police,—aided, we may hope, by some amelioration in the

feelings of the people,—have annihilated the use of the Blood-hound in both the objects for which it was formerly employed. The race has been gradually diminishing, and is now very rarely to be met with in its purity. Amongst the very few instances of its present existence, I may mention a fine breed in the possession of Mr. J. Bell, of Oxford-street, who retains them in great purity, and to whose kindness I am indebted for the present figure, which he permitted to be taken from “Strafford,” one of his magnificent Dogs.

It is a large, powerful breed, standing not less than twenty-eight inches high. The muzzle is broad and full; the upper lip large and pendulous; the vertex of the head protuberant; the expression stern, thoughtful, and noble; the breast broad; the limbs strong and muscular: the original colour is a deep tan, with large black spots.





THE OLD SOUTHERN-HOUND

Is probably the first remove from the type of the Blood-hound. It is a fine, handsome, noble-looking Dog, with long rounded ears and full lips, though less so than those of the Blood-hound; but it is slow in pursuit, and has now very generally yielded to the more active and swift Fox-hound. The Southern-hound is spotted like the latter breed, of which it is probably the parent, by a cross with the light and active Harrier. The figure is from a fine specimen obligingly lent me by Mr. Herring.

THE STAG-HOUND.

The opinion of those who have attended most carefully to the different breeds of Dogs is, that the Stag-hound is the produce of a cross between the old Southern-hound—the ancestor probably of most of our present races of Hounds—

and the fleet Fox-hound. The result of this mixture is the production of a tall, strong, bony, well-formed Dog, full of energy and power, combined with considerable swiftness and great perseverance: it is also of mild and gentle manners and expression.

The employment of this majestic breed is now passing fast into disuse: but a few years since, during the reign of George the Third, whose attachment to Stag-hunting almost amounted to a passion, the royal Hounds were kept up with a degree of spirit and liberality commensurate with the high and exciting character of the sport, and the rank of their royal owner. Under the auspices of that English-hearted monarch, and often in his presence, the fleetness, strength, and perseverance of the Stag-hound were exhibited in a very memorable manner; and the details of some of the Stag-hunts in which he partook, show that the character for personal courage which the king generally received, was not the mere homage of courtly adulation. The late Earl of Derby also maintained a fine pack of this noble breed.

As I am anxious to avoid long and tedious anecdotes of the different kinds of chase in which the various Dogs are employed, I shall not detail any of the numerous accounts of memorable runs, which sportsmen love to tell, better than their auditors to hear. It is perhaps sufficient to state that it is no unfrequent circumstance, that of a field of a hundred or a hundred and fifty horsemen, not more than from twelve to twenty can make their appearance at the death or taking of the Stag. As the following is but a short description of a hunt of this kind, and as it affords a tolerable epitome of the sport, I venture to quote it almost verbatim, from a work of acknowledged authority in these matters, the Sportsman's Cabinet:—"The Deer was liberated at the starting-post of Ascot Heath, and after making Bagshot Park, proceeded

without head or double over the open country to Sandhurst, through Finchamstead Woods, Barkham, Arborfield, Swallowfield, Mortimer, across the river Kennett, and over the intervening country to Tilehurst below Reading in Berkshire, where the Deer was taken unhurt, after a most incredible and desperate run of four hours and twenty minutes; horsemen being thrown out in every part of the country through which they passed: one horse dropped dead in the field; another immediately after the chase, before he could reach the stable, and seven more within the week. Of such severity was this run, that tired horses in great danger, and others completely leg-weary, or broken down, were unavoidably left at various inns, in different parts of the country."

And now I may venture to ask, Is this, or is it not, rank and gratuitous cruelty? It however demonstrates the astonishing powers of the Hound, in a manner which would scarcely be credible were not such scenes, or nearly such, of no rare occurrence.





THE FOX-HOUND.

Canis fam. sagax. Linn.

THE extreme care which has for so long a time been bestowed on the breed of this beautiful Hound, appears to have been rewarded at last, by the attainment of the highest possible degree of excellence, in the union of fine scent, fleetness, strength, perseverance, and temper. The English breed of Hounds is indeed, beyond all competition, superior to that of any other country, in all the essential points of his structure and character. The points of external form, according to an acknowledged authority, are these:—"His legs should be straight as arrows; his feet round and not too large; his shoulders back; his breast rather wide than narrow; his chest deep; his back broad; his head small; his neck thin; his tail thick and bushy, and well carried." The average height of the most approved breed is from twenty to twenty-two inches,—about five inches lower than the Stag-

hound; but his speed and spirit are such as to render him altogether the most complete and valuable of all the Dogs of the chase. In some experiments made on the swiftness of Hounds, it was found that Merkin, a celebrated Fox-hound belonging to Colonel Thornton, performed four miles in seven minutes; an astonishing degree of speed, if the size of the animal be considered. A good pack of Fox-hounds will often sustain a chase of six or eight hours; and the following recorded case shows that even this is not the limit to their powers:—In January 1738, the Duke of Richmond's Hounds found their Fox at a quarter before eight in the morning, and killed him at ten minutes before six, after a chase of ten hours' hard running. Many of the sportsmen tired three Horses each: eleven couple and a half of the Hounds only were in at the death; and several Horses died during the chase.

The exciting pleasure of an old English Fox-chase is now but a rare occurrence. The more systematic and accomplished style of hunting which has since been introduced, must be tame when compared with the primitive and exhilarating sport enjoyed by our forefathers.

THE HARRIER.

This is a still smaller breed of Hound, used exclusively, as its name imports, for hunting the Hare. It is generally from sixteen to eighteen inches in height. The best breed, according to Beckford, is “a cross between the large slow-hunting Harrier and the little Fox-beagle;” though in some parts of the country, in rough heath-tracks, where the Hares are particularly large and strong, and the ground very rugged, it is not unusual to form packs of Hare-hounds by draughting

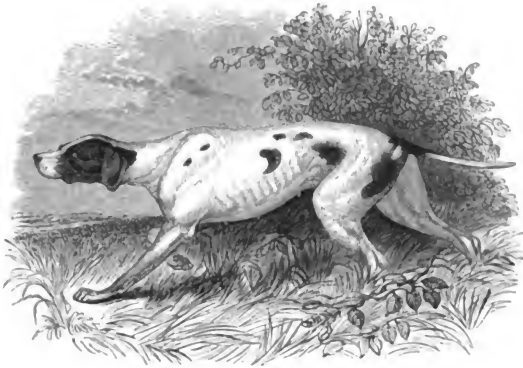
the smaller Dogs out of Fox-packs. If it could be proved that the Beagle were antecedent, as a distinct breed, to the present race, it would be scarcely doubtful that the Harrier has been produced by a cross between one of the larger Hounds and that diminutive race. Probably, however, it is nothing more than a diminutive race of the Stag or Fox Hound.





THE BEAGLE.

This is a still smaller variety of Hound than the Harrier, and is in fact the most diminutive of all the Dogs of chase, being not more than from twelve to fourteen inches in height. It was formerly a favourite Hound for hunting the Hare, but is now very little used, the Harrier having almost wholly superseded it. Although from its size it is necessarily slow, it makes up for this deficiency by extraordinary perseverance and exquisite scent, following the Hare through all her intricate doublings; and notwithstanding it rarely approaches her during the early part of the chase, it seldom fails to kill at last, though sometimes not until after a pleasing and interesting chase of three or four hours. The note of the Beagle is peculiarly sweet and musical. It was customary with our forefathers to follow their Beagles on foot, with a long hunting-pole, by the assistance of which they would take leaps which to our degenerate huntsmen would be absolutely appalling.



THE POINTER.

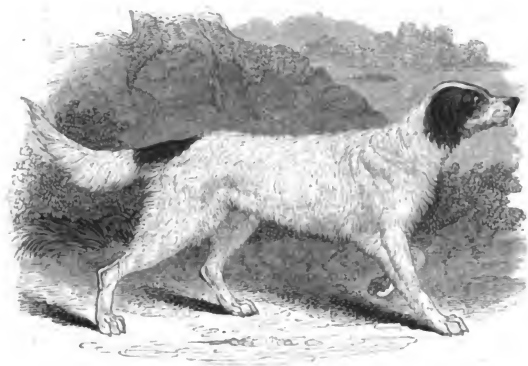
Canis fam. avicularis. Linn.

THERE is not perhaps a single instance which confirms in a more remarkable manner the opinion before advanced, that the acquired propensities of the different varieties of Dog are transmitted from parent to progeny, than is offered by this useful race. Requiring, as it must originally have done, a long and persevering education, to produce even a moderate approach to the excellence of the present breed of Pointers, these sagacious Dogs will now, almost without education—or, in technical phraseology, with very little breaking—exhibit a strong tendency to the peculiarity of their race, and stand at game of every kind, and this even while they are yet puppies.

The Pointer is probably originally a native of Spain ; and the Spanish Pointer was formerly well known as a stanch, strong, and useful, but heavy and lazy Dog. The English

breed, however, is now very much preferred: it is exceedingly beautiful, good-tempered, stanch, and patient of fatigue; and at the same time light and active in its appearance and habits. A stanch Pointer will not only stand at the scent of a bird or Hare, but if he be in company, he will instantly back, as it is termed, if he see another Dog point. The perfection to which this propensity to stand at the scent of game is brought, is one of the most striking examples of the docility of the Dog. Whether it be absolutely superadded to the original instinct of the animal, or a mere modification of it, can scarcely perhaps be satisfactorily determined. I have heard my father, a man of close observation and an enthusiastic sportsman, offer the opinion that the stand of the Pointer and the crouching of the Setter are but the natural start of surprise or interest, which all Dogs give when coming suddenly upon the scent or sight of their natural prey;—modified of course by cultivation, and by transmission through many generations, each, by education, improving upon the capabilities of the former. The fact, however, that a Pig has been trained to point game, may be supposed to militate in some measure against this opinion. The person who performed this curious feat was Toomer of the New Forest, who was celebrated in his day for the perfect manner in which he broke his Dogs.

In *Daniel's Sports* is a beautiful engraving, after Gilpin, of a pair of Pointers, a black dog named Pluto, and a white bitch, Juno, of which it is related that "they kept their point when Mr. Gilpin took the sketch from which the picture was painted, upwards of one hour and a quarter;" an instance of steadiness perhaps without a parallel.



THE SETTER.

Canis fam. index. Caius.

ENDOWED with a degree of sagacity and intelligence equal at least to most other varieties, the Setter surpasses almost every other in affection, docility, and the most humble and anxious solicitude to please. In its disposition and temper, indeed, it is gentle, timid, readily attached, and exceedingly grateful for every act of kindness; and in the field it is much esteemed for its intelligence, the acuteness of its nose, and its endurance of fatigue. In figure, it partakes of the characters of the Pointer and Spaniel, from which it has most probably descended; but it is not unlikely that the original Setting Dogs, which were trained to set to the nets, were large Spaniels. The first person, says Wood,* who broke a Setting Dog to the net, was Dudley, Duke of Northumberland, about the year 1535. The general colour of the

* Ath. Oxon. II. 27.

English Setter is a white ground with large spots or blotches of liver colour or red. The hair is less smooth than that of the Pointer, and possesses more or less of the waved character of the Spaniels, as do also the cars.

By far the most interesting and, if I may so employ the term, amiable animal I have ever known, was a bitch of this kind, formerly belonging to my father, which he had from a puppy, and which, although never regularly broke, was the best Dog in the field that he ever possessed. The very expression of poor Juno's countenance was full of sensibility and affection. She appeared to be always on the watch to evince her love and gratitude to those who were kind to her; and the instinct of attachment was in her so powerful, that it showed itself in her conduct to other animals, as well as to her human friends. A kitten which had been lately taken from its mother was sent to us, and on Juno's approach showed the usual horror of the Cat towards Dogs. But Juno seemed determined to conquer the antipathy, and by the most winning and persevering kindness and forbearance—advancing or receding as she found the waywardness of her new friend's temper required—she completely attached the kitten to her; and as she had lately lost her puppies, and still had some milk left, I have often seen them lying together before the fire, the kitten sucking her kind foster-mother, who was licking and caressing her as her own offspring. She would also play, with great gentleness, with some tame Rabbits of mine, and would entice them to familiarity by the kindness of her manner; and so fond was she of caressing the young of her own species, that when a Spaniel bitch of my father's had puppies, of which all excepting one were destroyed, Juno would take every opportunity to steal the remaining one from its mother's nest, and carry it to her own, where she would lick and fondle it with

the greatest tenderness. Poor Busy, the mother, also a good-tempered creature, as soon as she had discovered the theft, hastened, of course, to bring back her little one, which was again to be stolen on the first favourable opportunity: until at length the two bitches killed the poor puppy between them, as they were endeavouring each to pull it from the other; and all this with the most perfect mutual good understanding. Juno lived to a good old age, an unspoiled pet; after her master had shot to her for fourteen seasons.





THE SPANIEL.

OF all the races of Dogs, the Spaniel is perhaps the most timid, fond, and affectionate—the most grateful for kindness, the most patient under ill treatment. If punished, it receives the chastisement with submission, and looks in the face of its offended master with an expression of humble sorrow for having been the cause of his anger; and the instant that the punishment is over, it comes courting the caresses of the hand that had inflicted the stripes, and asking again to be received into favour. At the slightest look of encouragement, its joy at the reconciliation seems to know no bounds, and is expressed by the liveliest indications of delight, jumping and fawning upon the person of him who had just before been inflicting bodily pain and mental distress—capering round him, and barking loudly with ecstasy. The instances of devoted attachment which have been recorded of this interesting and beautiful creature are not only more numerous,

but of a more affecting character than can be related of any other Dog. It is not merely as the favoured companion of his days of health and cheerfulness, and amidst the excitement of the sports of the field, that its attachment to man is shown; it is rather in the hours of sickness or of imprisonment, in the chamber of death or on the scaffold, and, finally, lying and starving on the grave of its beloved master, that the strength and endurance of its devotion are exhibited in their true characters. This is no overdrawn picture: the scenes of humble domestic life in this country, the portals of the Conciergerie and the platform of the guillotine in Paris, and the scenes of midnight murder during the Irish rebellion, have all furnished instances in proof of its literal truth. The following anecdote, though published long ago,* will, I believe, be in itself a sufficient apology for its insertion here, as an illustration of the character which I have given to the Spaniel.

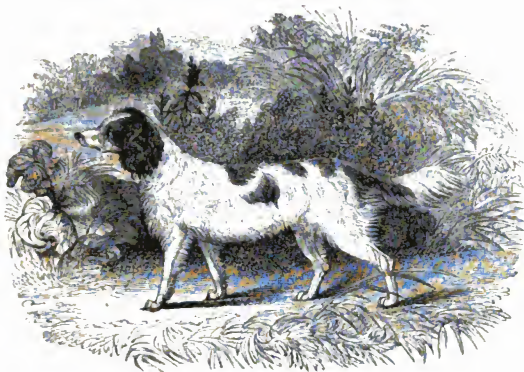
“ A few days before the overthrow of Robespierre, a revolutionary tribunal had condemned M. R. an ancient magistrate and a most estimable man, on a pretence of finding him guilty of a conspiracy. His faithful Dog, a Water-Spaniel, was with him when he was seized, but was not suffered to enter the prison. He took refuge with a neighbour of his master's, and every day at the same hour returned to the door of the prison, but was still refused admittance. He however uniformly passed some time there, and his unremitting fidelity won upon the porter, and the Dog was allowed to enter. The meeting may better be imagined than described. The jailor, however, fearful for himself, carried the Dog out of the prison; but he returned the next morning, and was regularly admitted on each day afterwards. When the day of sentence arrived, the Dog, notwithstanding the guards, penetrated into the hall, where he lay crouched be-

* Daniel's Rural Sports, III. p. 341.

tween the legs of his master. Again, at the hour of execution, the faithful Dog is there; the knife of the guillotine falls, but he will not leave the lifeless and headless body. The first night, the next day, and the second night, his absence alarmed his new patron, who, guessing whither he had retired, sought him and found him stretched upon his master's grave. From this time, every morning for three months, the mourner returned to his protector merely to receive food, and then again retreated to the grave. At length he refused food; his patience seemed exhausted, and with temporary strength, supplied by his long tried and unexhausted affection, for twenty-four hours he was observed to employ his weakened limbs in digging up the earth that separated him from the being he had served. His powers, however, here gave way; he shrieked in his struggles, and at length ceased to breathe, with his last look turned upon the grave."

There are several varieties or distinct breeds of the Spaniel, of which the common and most useful sort, the English Spaniel, is the one figured at the head of this description. It is an elegant Dog, of a moderately strong make, the muzzle rather broad, the ears remarkably long and full; the hair plentiful, and beautifully waved, particularly that of the ears, tail, the hinder parts of the thighs and legs, and the belly. It is usually liver colour and white, or red and white; though sometimes black is the prevailing colour, with a tan spot over each eye, on the face and breast.

The beautiful breed called King Charles's Spaniel was black and white, and is supposed to have been the original race of the little black Cocker: but it would appear, judging of the proportions, by the Dogs introduced by Vandyke into his pictures of that ill-fated monarch, that they must have been larger Dogs.



The Springer is a small but elegant breed: it is generally red and white, with black nose and palate. The smallness of the head and the length of the ears are essential points in Dogs of this race. The true Marlborough breed is sometimes called the Springer: it is, however, a shorter Dog, with a less taper muzzle. These Spaniels are sometimes sold for an enormous price. Within the last few weeks a man was brought before a magistrate, charged with having stolen or lost one of these Dogs; and on being asked the value of the Dog, the owner deposed that it was worth seventy-five guineas, and that he had already refused seventy pounds for it.

The larger and smaller Water-Spaniels differ from each other only in size, and from the other Spaniels in the roughness of their coats, which approach in this respect to the large Water-Dog, from which and the common Spaniel they are probably descended. They are highly intelligent and useful animals, uniting the fine hunting qualities of the Spaniel with the aquatic propensities of the Newfoundland Dog.



THE WATER-DOG.

THE peculiar qualities and propensities of this Dog, its exquisite sense of smell, its sagacity, strength, and aquatic habits, have rendered it a most useful and important servant to a particular class of persons, though but little regarded by any others. These are the numerous gunners of the North of England and Scotland, who live principally by shooting water-fowl, in the retrieving of which these Dogs exhibit the highest degree of docility and hardihood. The Water-Dog must not be confounded with the Water-Spaniel, from which indeed it differs considerably in size and in proportions. It is of a much more robust make; the muzzle is short, and stands out abruptly from the face: the ears are of moderate length; the hair is everywhere curled and shaggy, by which the water is prevented from penetrating; the tail is rather short, and somewhat erect; the colour generally black, with more or less white; sometimes brown and white, or nearly all white.

The unerring accuracy with which this Dog can be taught to search for and bring back to his master, articles which have either been lost or purposely left for the exercise of his powers, forms one of the most surprising instances of sagacity and intelligence to be found in the history of the species. If a coin or other small article be shown to the Dog, and then put in a place of concealment, and the Dog be sent even long afterwards, and from a distance, he searches the spot where it had been placed, until he finds it, and then returns it to his master. This power has often been carried to a great degree of perfection, and employed in perpetrating a destructive robbery of ducks, and other water-fowl.

A friend of mine possessed a bitch of nearly the same breed, which evinced a degree of intelligence scarcely less than human. One instance of her sagacity and faithfulness I cannot refuse myself the pleasure of recording. My friend was travelling on the Continent, and his faithful Dog was his companion. One day, before he left his lodgings in the morning, with the expectation of being absent until evening, he took out his purse in his room, for the purpose of ascertaining whether he had taken sufficient money for the day's occupation, and then went his way, leaving his Dog behind. Having dined at a coffee-house, he took out his purse, and missing a louis-d'or, searched for it diligently, but to no purpose. Returning home late in the evening, his servant let him in with a face of much sorrow, and told him that the poor Dog was very ill, as she had not eaten anything all the day; and what appeared very strange, she would not suffer him to take her food away from before her, but had been lying with her nose close to the vessel, without attempting to touch it. On my friend's entering the room, she instantly jumped upon him, then laid a louis-d'or at his feet, and immediately began to devour her food with great voracity. The truth was

now apparent: my friend had dropped the money in the morning when leaving the room, and the faithful creature finding it, had held it in her mouth, until his return enabled her to restore it to his own hands; even refusing to eat for a whole day, lest it should be out of her custody. I knew the Dog well, and have witnessed many very curious tricks of hers, showing extraordinary docility.





THE TERRIER.

Canis fam. terrarius. Flem.

THIS acute, bold, and clever little Dog bears in its form but a very remote relation to any of the other varieties, and appears to have existed from a very remote period as a distinct race, which in the present day is preserved in its purity with the greatest care. There are two distinct varieties of the Terrier: the one smooth, sleek, and of a rather gracile form, of a bright black colour, with the belly, the throat, the paws, and a spot over each eye, of a bright reddish brown, or tan, as it is commonly called. The head is carried high; the muzzle is sharp; the eye quick and bright; the ears erect, but with the tips sometimes pendulous; the body neat and compact; the legs and feet slender, yet strong; the tail erect, stiff, and slightly curved. From a good one of this breed the figure at the top of the page was taken. In this individual there was a white spot on the breast, which, although it does not evince the least impurity in the breed, is



not so perfect a fancy Dog as if the breast had been tan without any white.—The other is called the Scottish or Wire-haired Terrier, and it differs from the former in the rough, harsh character of the hair, the shortness of the muzzle, the shortness and stoutness of the limbs, and the colour, which is generally dirty white; though they vary greatly in this respect.

The Terrier is applied to several purposes in which its diminutive size, its strength, courage, activity, and perseverance are all called into action. In the office of unearthing the Fox, it is an essential addition to the pack, and a good kennel can scarcely be without them; and it takes the earth with much eagerness, from which it has received its name. But if the Terrier contribute so much to the enjoyment of the regular sportsman, it offers no less amusement to those of a less dignified character, by the feats it displays in the destruction of minor vermin,—the Badger, the Polecat, and the whole tribe of *Mustelidæ*, and particularly the Rat.

The clever manner in which it deals with the largest and boldest of these savage creatures, and the rapidity with which it kills them, can scarcely be described. The celebrated Dog "Billy" was turned into a room where there were one hundred Rats; the object being to decide a wager that he would kill that number within a given time. It was done in less than seven minutes.

A large breed crossed with the Bull-Dog, and termed the Bull-Terrier, constitutes one of the most savage and determined races of Dogs known. It has been generally employed in the brutal and cowardly amusement of Badger-baiting, and the still more disgusting one of Dog-fighting; both of which, disgraceful to humanity as they were, are now happily of far less frequent occurrence than formerly. I can scarcely imagine a scene at which the mind recoils with more instinctive disgust and horror, than at those which were commonly, and I believe are still occasionally, exhibited in the very heart of the most polished district of the metropolis of this, the most humane and the most religious nation in the world! The savage ferocity of the Dogs, tearing and worrying each other, sometimes to death, without the utterance of a bark, a growl, or a cry,—for such is the habit of a thorough-bred Dog,—is as nothing compared with the disgraceful assemblage of high and low, noble and plebeian blackguardism, that surrounds the combatants, offering an example of ferocity equal to that of the Dogs themselves—but with the degrading addition, that the spectators are human beings, endowed with reason, and some of them men of high and refined education.



DALMATIAN-DOG. COACH-DOG.

OF this variety, showy and beautiful as it is, little that is interesting can be said. It is kept, in this country at least, merely as an appendage to the carriage, or a companion to the Horses, and has neither the fine scent nor the sagacity to render it really useful in any of the ordinary offices of the Dog. It has been erroneously ranked amongst the Hounds by Buffon, who, however, doubts its being an Indian variety ;— an origin which has generally been assigned to it, and in allusion to which it is called by the French writers “ Braque de Bengale.” It has indeed been long known in different parts of Europe, and no one ever heard of its being employed in hunting, for which in fact it is wholly incapacitated by the deficiencies just mentioned. In shape it is somewhat between the Pointer and the Hound ; it is rather elegantly formed, the limbs being moderately stout, as well as the head and body. It is white, with numerous small roundish black spots, which here and there coalesce into broad splotches.



THE SHEPHERD'S DOG.

COLLY. SHEEP-DOG.

Canis fam. domesticus. Linn.

To this variety has been assigned, almost by common consent, the distinction of being the primitive race from which all the others have sprung. For the ingenious but vague and unsatisfactory grounds upon which this hypothetical notion has been founded, it is sufficient to refer to Buffon, who originated it, and who has been followed by almost every subsequent writer on the subject. Were we indeed to conclude that the typical form of the species would exhibit in the highest degree the fine mental qualities by which the Dog is distinguished, there would be some reason for selecting the present race as that type; for in no other are intelligence, faithfulness, and perseverance so conspicuously shown. The shepherd who tends his hundreds or thousands of Sheep on the moors and the mountain-sides of Scotland and of

Wales, or on the extensive and trackless downs of Wiltshire, commits his almost countless charge to the care of his Dogs, with the certainty that their safety and welfare will be surely provided for by the activity, watchfulness, and courage of their intelligent and faithful guardians. Some of the recorded instances of the almost human sagacity evinced by this valuable race would exceed belief, were they not authenticated by the most credible witnesses. In Scotland particularly, where the flocks are so liable to be lost in snow-wreaths, these qualities are beyond all price; and are often exhibited in a manner equally affecting and wonderful.

In temper and disposition the Sheep-Dog is calm, serene, and quiet: but under a thoughtful and almost heavy aspect, there sparkles an expression of readiness and inquiry in his eye, as it peers out from under his shaggy brow, which betokens a spirit always on the alert, and prepared for instant obedience to the commands or wishes of his master. He has not, it is true, the noble port of the Newfoundland-Dog, the affectionate fondling of the Spaniel, nor the fierce attachment which renders the Mastiff so efficient a guard; but he exceeds them all in readiness and extent of intelligence, combined with a degree of docility unequalled, perhaps, by any other animal in existence. Without showing any of that fierce enmity to strangers which renders many other Dogs so formidable, he does not appear solicitous to become familiar with them; but rather shuns all society but that of his master, to whom he is steadily, devotedly, and almost exclusively attached.

In size the Shepherd's Dog does not equal the smallest breed of the Newfoundland Dog, being generally about fifteen inches high. The ears are half erect; the hair soft, long, shaggy, and somewhat waved; the tail bushy, of moderate length, slightly pendulous, and more or less recurved.

The prevailing colour is black or dark grey. There are, however, three breeds of the Sheep Dog in this country. The purest, and perhaps the most intelligent, is the Colly of the Scottish shepherds. The usual height of this breed is not more than twelve or fourteen inches. The Southern Sheep Dog is rather larger and less shaggy than the former; the ears are sometimes quite erect; the tail in some individuals very short,—a peculiarity which appears to be perpetuated from parents whose tails have been cut. The third breed is the large Drover's Dog, or Cur, generally of a black colour with a mixture of some white; it is employed to conduct the droves of Sheep and cattle from their native downs or meadows to the metropolitan or other markets or fairs. It is exceedingly useful in its limited sphere, keeping Sheep and cattle with great regularity within their allotted bounds, and reducing the refractory part of his charge by means of great perseverance and strength, but without ever exceeding a very moderate degree of violence or severity.



THE LURCHER.

THE aspect of this Dog is as gloomy and lowering as the season of its principal occupation. Possessing the combined qualities of the Greyhound and the Shepherd's Dog, from which it has been supposed to be descended, the Lurcher exhibits the lengthened muzzle and limbs of the former, modified by the stout, rough, homely form and characters of the latter. It is lower than its more elegant progenitor, with a rough wire-haired coat, the ears half erect, the tail rather short and pendent. The colour is usually a sandy red ; but sometimes it is seen black or dark grey. If, however, the Lurcher resembles the Greyhound in form, its sagacity and attachment evince more clearly still its descent from the Shepherd's Dog ; and the lurking, sly, and downward expression of its eye, is but a mask for qualities which render it one of the most useful assistants to a class of men who, lawless and abandoned as they generally are, require the aid of the most trusty and intelligent and attached of the canine race. It is, in short, peculiarly the poacher's Dog. For the nefarious and demoralising nocturnal trade of these men, the silent, stealthy habits of the Lurcher are admirably adapted ; and one which is well educated, or broken to the business, will serve all the purposes of every other kind of sporting Dog, in a manner the most efficient for the objects of its wretched master's pursuit. If he be hunting Rabbits, and should start one at a little distance from its place of resort, the Dog runs for the burrow, and here is sure to secure it. In driving partridges into the net, it uses all the circumspection which so delicate and difficult a task requires ; Hares often fall before its combined speed and cunning ; and a well-bred one will seize and pull down a Fallow Deer, and then quietly return to its master, to lead him to the scene of

its successful adventure. In all these offices a well-bred Lurcher never gives tongue, but pursues its object in silence, and with a degree of sagacity and intelligence which would do credit to a better calling.

The game-laws, after all that can be said in their favour by those most interested in their existence, are an opprobrium to the legal code of this country; and much of the wretchedness and vice which characterise the generality of poachers, and much too of the destruction of human life, either by midnight murder or on the scaffold, is to be attributed to the unequal and tyrannical nature of these laws. The late attempt at their amelioration seems to have signally failed; and by virtually giving a premium to the poacher, has increased the frequency of crime.





THE GREYHOUND.

GREHOUND.

Canis fam. Graius.

It is probable that this elegant variety is one of the oldest breeds which can now be traced as having been used in the course. The account given by Arrian (*An. Dom. cir. cL.*) of the mode pursued in his time in coursing the Hare could only have been available with this Dog, and is so similar to that which is employed even in the present day in the same sport, that it is evident the Gauls must not only have been familiar with the peculiar habits of the Hare, and equally versed in the best method of training their Dogs, but must also have carried the etiquette of this chase to the most liberal and sportsmanlike extent. It appears that the first step was to send out their Hare-finders, who returned with an account of the game they had seen, and the sportsmen then mounted their Horses, and led out their Dogs to

course them. Two Dogs only were to be slipped at once, and fair law was allowed to the Hare. Indeed, the object of the chase was not to kill the game,—an event which they were particularly careful to avoid,—but to try the comparative speed of the Hare and the Dogs. Many other customs detailed by this author exhibit the same liberal, and, if I may be allowed such an expression here, gentlemanlike feeling, which have doubtless descended to the present time without intermission. In the early history of our own country, since the Conquest, the Greyhound has been noticed as one of the most valuable and aristocratic of Dogs. In the time of the haughty and selfish John, Greyhounds were, with Horses, occasionally accepted by the king, in lieu of money for fines and forfeitures, or on the renewal of grants from the crown. The third Edward, who usually held his court at Greenwich during the hunting season, in order to be contiguous to his royal forest in Essex, kept his Greyhounds, with his other Dogs, in what has from that circumstance been called the Isle of Dogs. In this instance, as in more ancient times, the game coursed by the Greyhounds was principally the Red Deer, and the Fallow Deer; and it is clear that the Dogs must necessarily have been of a very powerful breed to have pulled down so large and active and strong an animal. “In the days of Elizabeth,” says Daniel, “when she was not herself disposed to hunt, she was so stationed as to see the coursing of the Deer with Greyhounds;” and we hear of her witnessing upon one occasion, “sixteen bucks, all having fayre lawe, pulled down with Greyhounds.”

The present breed of this Dog can scarcely be so large and powerful as those which have just been mentioned. They have indeed been carefully bred for swiftness and wind, and endurance of sudden and violent bursts of exertion; and hence the largest and most robust Dogs are not always the

most valued. The peculiarity of the Greyhound is, that it hunts by sight, and not by scent. The nose is far from being keen, and everything is therefore sacrificed, in breeding it, to the objects just mentioned, to which its whole form is admirably adapted. The muzzle is long and pointed; the head narrow and thin; the neck thin; the body lank, and very much contracted beneath, at the flanks; the back broad and muscular; the limbs combining length of bone with great muscular power; the tail very slender, and curved upwards. The beautiful animal whose portrait I have placed at the head of this account, is in the possession of my friend Mr. Vigors, who has kindly allowed me to have the drawing made from it. It is a white bitch, without a spot, and perhaps the most elegantly formed Greyhound I have ever seen.

The comparative swiftness of the Greyhound with the Hare and with the Race-Horse, has often been matter of doubt. The following opinion, quoted by Daniel, from what he appears to have considered as good authority, is probably correct:—"Upon a flat, a first-rate Horse would be superior to the Greyhound; but in a hilly country, as in Wiltshire, the Greyhound would have the advantage." With regard to the Hare, the same authority has given the opinion that "a capital Greyhound would not suffer a Hare to run from him without turning her." The actual swiftness of both these animals is certainly astonishing. More than thirty years ago, as Daniel relates,* a brace of Greyhounds, in Lincolnshire, ran a Hare from her seat to where she was killed, a distance measuring straight upwards of four miles, in twelve minutes: during the course there was a good number of turns, which very considerably increased the space gone over; the Hare ran herself dead before the Greyhounds touched her.

* Rural Sports, I. p. 435.

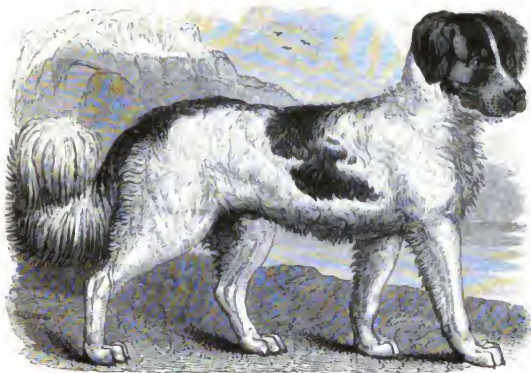
The etymology of this name is uncertain. Some have supposed it to be derived from *Graius*, Grecian, because it was possibly first used by the Greeks. (Minshew.) This derivation is more probable than the Dutch *grüp-hund*, from *grypen*, to gripe,—or Caius's fanciful one, “quod præcipui *gradús* sit inter canes.” Perhaps, after all, the most simple and obvious is the true one,—from the prevailing colour of the ancient breed of this Dog.

THE IRISH GREYHOUND,
OR WOLF-DOG.

OF this magnificent breed it is probable that there now remain no pure, unmixed examples, even in the country where it was once so much prized. It was used in hunting the Wolf, when that animal still infested the forests of Ireland, and was carefully preserved, even to a late period, by a few persons in that part of the United Kingdom, by whom it was prized rather on account of its fine stature and noble bearing, than as being of any considerable utility. The figures of this Dog usually indicate a considerable approach to the Greyhound in form; but in that given in the third volume of the Linnean Transactions, by my respected friend Mr. A. B. Lambert, the venerable vice-president of the Linnean Society, this resemblance is very slight. It appears that the breed was originally produced from the great Danish Dog crossed by the Greyhound,—at least its points in general warrant this supposition; and the ancient Scottish Wolf Dog was doubtless derived from a similar origin. Almost the last person who kept this breed in Ireland was Lord Altamont, who in the year 1780 had eight of them, from one of which Mr. Lambert's drawing was taken.

The dimensions of the largest were as follows :—From the tip of the nose to the end of the tail, five feet one inch ; the tail, one foot five inches long ; from the toes to the top of the shoulder, two feet four inches and a half. The hair is short and smooth ; the colour brown and white, or black and white. Mr. Lambert observes, “ they seem good-tempered animals, but, from the account I received, are degenerated in size : they were formerly much larger, and in their make more like a Greyhound.” There can be no doubt that they gradually lost the characters which had formerly distinguished them, either by change of habit, or by some accidental cross.





THE NEWFOUNDLAND DOG.

FEW of the varieties of the canine race have received, with more deserved profusion, the meed of universal praise and regard, than the Newfoundland Dog. Possessed of such limited powers of scent as unfit it for the exercise of the usual duties of the Hound or the Pointer, and, on the other hand, devoid of the fleetness of the Greyhound, its sagacity and faithful attachment, combined with great strength, hardihood, and patience, have yet rendered it one of the most extensively useful, as well as companionable, of the whole race. In the earlier works in which Dogs are treated of, it is not mentioned; and was therefore most probably unknown here, until imported from the island from which it takes its name. In Newfoundland it constitutes an important beast of draught, bringing loads of wood or of provision in sledges, over a rugged and difficult country, with the most indefatiga-

ble perseverance. As a Water-Dog it perhaps surpasses every other kind, and, both in this country and in its native island, becomes a most valuable assistant to the aquatic sportsman, in rescuing his birds from the water; in which office it evinces a degree of perseverance and sagacity equal at least to the best-bred Water-Dog. In temper it is dignified, sober, affectionate, and patient; bearing, with the greatest composure, the insults of more ignoble Dogs, and the incessant teasing of children, towards whom it always appears to entertain the most kindly feelings of regard. As the protector of its master's property it is scarcely second to the Mastiff; and the quiet fondness and attachment which it exhibits towards the inmates or friends of the household, is finely contrasted with the fierce faithfulness with which it flies at the nocturnal intruder upon the domain which is committed to its guardianship. Its memory is equally worthy of notice with the qualities which I have already detailed; it recognises at once the friend of the family though after a long absence, with perhaps but a brief previous acquaintance.

The power of Dogs to mark distinct periods of time cannot be denied; there are many instances on record in proof of it; but the following is detailed as having fallen under my own knowledge:—A fine Newfoundland Dog, which was kept at an inn in Dorsetshire, was accustomed every morning as the clock struck eight, to take in his mouth a certain basket, placed for the purpose, and containing a few pence, and to carry it across the street to a baker's, who took out the money, and replaced it by a certain number of rolls. With these Neptune hastened back to the kitchen, and safely deposited his trust; but, what was well worthy of remark, he never attempted to take the basket, or even to approach it, on Sunday mornings. On one occasion, when re-

turning with the rolls, another Dog made an attack upon the basket for the purpose of stealing its contents ; when the trusty fellow placed the basket on the ground, severely punished the intruder, and then bore off his charge in triumph.

With all the fine qualities of the Newfoundland Dog, however, it must in truth be confessed, that when kept in close confinement, it sometimes exhibits a degree of capricious fierceness, from the exercise of which even its best friends are not wholly secure. I have known more than one instance of the owner of a Dog of this kind, who had been accustomed to caress it without fear, and to receive from it the most unequivocal marks of affection, being suddenly, and without the least provocation, attacked and severely injured by his former favourite. This, however, is, I believe, a circumstance never to be feared when the Dog is at liberty ; and it is not improbable that such examples of misdirected ferocity may arise from the sagacious animal's suspicion of the original cause of the loss of his freedom.

The finest example I have seen of this race was a female in the possession of my friend Mr. Dell. I do not accurately recollect the height, but I remember that she used to lay her head horizontally upon the dinner-table, without raising it above its easy and natural position.

There are several varieties of the Newfoundland Dog which differ in size, character of the fur, and marking. The old smooth breed, with a rather small head, white, with small black spots scattered over the body, appears now to be extinct. The largest Dogs now met with are of the breed which I have figured. The muzzle is broad ; the head raised ; the expression noble and majestic ; the hair waved or curly ; the tail very thick and bushy, pendulous for half its length, and then curled upwards. The colour is black and white ;

the latter generally equalling, if not predominating over the former. But the most common breed at present, is comparatively dwarf, not exceeding in height a large Water-Spaniel, almost wholly black, and deficient in the fine expression which may be considered as characteristic of the older races. Such Dogs as these are now exceedingly common in those parts which are most intimately connected by commerce with the Island of Newfoundland.





THE BULL-DOG.

Canis lanarius. Caius.

WITH less of sagacity than is to be found in almost any other variety of the Dog, and with an almost total absence of that innate and distinguishing instinct of attachment which characterises the species in general, the Bull-Dog has but little to recommend it to our particular notice, and still less to excite any agreeable feelings in the consideration of its habits and propensities. Happily for humanity, the cowardly and savage amusement in which it was formerly employed, and for which the breed was kept up with the greatest care and attention, has at length been banished from our towns and villages by the common execration of all who deserved the name of man; and future generations will scarcely believe that in England, the barbarities of the most savage nations were far outdone, not only by the lowest and most ignorant and depraved of her sons, but by men of rank and

education, and even by numbers who enjoyed the distinction of the senatorial character : for it is a truth that, until a very late period, it was found impossible to obtain an act of the legislature for the abolition of Bull-baiting. The disappearance of this disgraceful and degrading sport is a great triumph of humanity ; for the heart literally sickens at the detail of the cruelties which essentially belonged to its enjoyment. The peculiar obstinacy and ferocity of this Dog were well adapted to the conquest of the noble animal destined to be exposed to its attacks : for it is a singular property of the Bull-Dog, that it will submit to torture and mutilation, rather than let go the hold it has once taken. Its savage pertinacity in the attack is so great, that an instance is on record of a wretch having laid a wager that his Dog would return to the attack of the Bull after each of his feet was severally cut off ; and he actually won it ; for after the last foot was struck from the body, the animal still attempted to spring upon the Bull. It is, however, unnecessary to dwell longer upon scenes which can only excite feelings of disgust and shame, and which are now mere matter of regret that they were ever possible.

The Bull-Dog is of moderate size, but very strongly built. The head, and particularly the muzzle, appears almost of disproportionate size to the body. The lower jaw projects beyond the upper, which gives a peculiar and most disgusting expression ; which is increased by a savage leer of the eyes, by the sudden rise of the head from the face and its great breadth, the distension of the nostrils, which are generally cleft, and the short erect ears. The limbs are clean, and remarkably muscular ; the back strong and compact ; the chest deep ; the belly drawn up ; the tail taper, stiff, and curved upwards. Some Bull-Dogs have a spurious fifth

claw on the hinder feet. It varies in colour, being sometimes black and white, but more frequently brindled.

There is a resemblance to another variety in many of its characters, which a hasty and superficial glance would scarcely detect ; but it cannot fail to be evident to those who remark the depth of the chest, the contracted belly, the peculiar form of the muscular limbs, and the character of the tail, that its relation to the elegant and elongated Greyhound is much nearer than would at first sight be supposed. The form of the muzzle is indeed exceedingly different ; but there is every reason to believe that this must have arisen in the first place from accident to a single individual, to whose progeny the peculiarity has descended as the mark of a distinct breed. With this exception, there is scarcely a distinctive character which may not be traced merely to the greater or less degree of elongation in the several parts.

The Pug, which has somewhat the aspect of the Bull-Dog, is a small variety, with the same projection of the lower jaw, the same short close hair, and similar conformation of the body. It is, however, the very reverse of that savage race in its disposition, being remarkably timid, and, though possessing little sagacity, tolerably good-tempered. It is useless in the field, and kept only as a pet, for which purpose, however, it is greatly inferior to most other Dogs.



THE MASTIFF.

Canis fam. molossus. Linn.

FROM the period of the Roman sway in this country till the present time, the English Mastiff has been considered one of the most courageous, powerful, generous, and intelligent of the race. In the amphitheatre of Rome it was often brought into close combat with other animals; and so great was the superiority of the English breed, that an officer was appointed in this country to breed and transmit them to the capital of the empire.

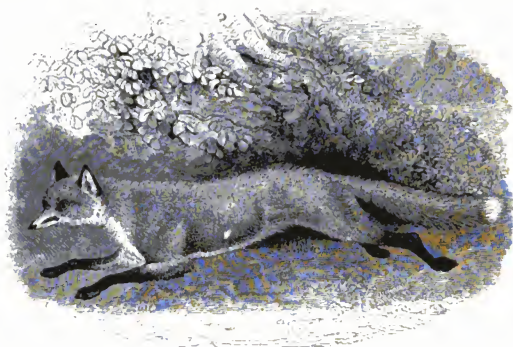
It is a large and powerful Dog, with a broad muzzle, very thick pendulous lips, a full and prominent brow, a heavy expression, and hanging ears of moderate size. The body is strong and well-proportioned, and the tail rather full. The pure breed is now rarely to be met with. In its combats with ferocious animals, more recent experiments have con-

firmed the excellence attributed to this breed by the Romans. There is a well-known and often-repeated story, of the truth of which there appears to be no doubt, that in the reign of James the First, three of these Dogs were found to be a match for a Lion. Unlike the Bull-Dog, it is susceptible of great attachment to all who are kind to it, and seldom, except when closely chained, offers any molestation without repeated aggression. It barks, too, before it bites. The Bull-Dog, on the other hand, attacks with a savage and insidious silence.



CARNIVORA.

CANIDÆ.



Genus, VULPES.

Generic Character.—Grinding teeth $\frac{5}{5}$; tongue smooth; claws not retractile; pupil when contracted elliptical; tail bushy.

COMMON FOX.

*Scotticè, TOD.**Vulpes vulgaris.* Briss.

Specific Character.—Reddish brown above, white beneath; behind the ears black; the tip of the tail white.

- Canis vulpes*, LINN. Syst. Nat. I. p. 59. MULLER, Zool. Dan. Prod. p. 2.
 DESMAR. Mammal. p. 201, sp. 304. FR. CUVIER, Dict.
 des Sc. Nat. VIII. p. 561. JENYNS, Brit. Vert. p. 14.
Vulpes vulgaris, BRISSON, Reg. Anim. p. 239, 5. FLEM. Brit. An. p. 13.
Le Renard, BUFFON, Hist. Nat. VII. p. 57, t. iv.
Fox, PENNANT, Brit. Zool. I. p. 71. SHAW, Gen. Zool. I. p. 314.

THE FOX has been celebrated from the earliest antiquity, for the cunning and ingenuity which it manifests, whether in obtaining food, or in eluding pursuit. The general expres-

sion of its features, the obliquity and quickness of the eye, the sharp shrewd-looking muzzle, and the erect ears, afford the most unequivocal indications of that mingled acuteness and fraud which have long rendered it a bye-word and a proverb ; for it is well known that this character of its physiognomy is not falsified by the animal's real propensities and habits.

The Fox lives in burrows ; either excavating them for himself, or seizing upon and appropriating the preoccupied habitations of some other fossorial animal, as the Badger or the Rabbit. In this retreat, which, in sportsman's language, is called its earth, it remains concealed during the day, and comes abroad only in the night in search of its food. Its instinctive cunning leads it soon to suspect the wiles of its enemies ; and it will, in a very short time, ascertain the design of a trap or a gin, though concealed with the utmost care. It is credibly stated by a French writer, that a Fox has been known to remain within its retreat without food for fifteen days, rather than risk the danger of falling into the traps, which its sagacity had ascertained to be set around it.

My kind friend and correspondent Mr. Hogg, to whom I am indebted for much interesting information on the habits of many of our indigenous animals, writes thus :—" I remember once when out hunting, the Hounds found a Fox who did not leave the cover, but kept running from one part of it to another. Just as a Hound was about to seize him, he jumped over the Dog, and thus saved himself. This tedious sport was kept up for a long time, till Reynard being thoroughly tired with so many leaps and so many enemies, at last fell a prey to them. The huntsman on taking him up found that he had lost one of his fore legs.—The cover being entirely of furze and not large, I could see all sides of him during this hunt, and was much pleased with the many elegant and quick leaps which the poor three-legged Fox made to save himself from destruction.

“ The young are very active ; and I have seen them occasionally at play on a summer’s evening, jumping over their dam and each other, and running after their brushes. They have a short stifled bark.”

Its usual prey consists of Hares, Rabbits, various kinds of ground-birds, particularly partridges, of which it destroys great numbers ; and it often makes its way into the farm-yard, committing sad havock amongst the poultry. It has been known, not unfrequently, to carry off a young lamb. In default of this, its favourite food, it has recourse to “ Rats and Mice, and such small Deer,”—or even to Frogs, worms, and the larger insects. It also resorts to the sea-shore, in search of such fish, mollusca, crustacea, and other marine animals, as the tide has left upon the beach.

The Fox can scarcely be said to be susceptible of attachment, or capable of being tamed. The utmost degree of domestication to which it can be reduced, is to suffer the person who has fed and brought it up, to handle it without much danger of being bitten ; but it is wholly devoid of that instinct of gratitude and kindness which characterise its congeners—the Dog, and even the Wolf and Jackal. Although taken young, or even born in captivity, and brought up in company with domestic Dogs, it still remains suspicious, sly, and timid, retreating from every attempt at familiarity, and scarcely distinguishing its companions by any mark of recognition.

It has often been asserted that the Fox and the Dog will breed together. The experiments of Buffon certainly failed, and I have in vain endeavoured to trace any valid ground for this general belief. This refusal to intermix with the Dog evinces a far more remote affinity to that animal than either the Wolf or the Jackal, with both of which the experiment has often been successfully made. The female Fox

loses all her timidity and shyness when suckling her young, in whose defence she exhibits a degree of courage and boldness which are very foreign to her general habits and disposition. The time of gestation is not perhaps accurately ascertained, but is certainly between sixty and sixty-five days. The young are born in April, and are a year and a half in attaining their full size. The Fox is said to live thirteen or fourteen years; but as this can only have been ascertained of individuals in confinement, it is exceedingly probable that in a state of nature it considerably exceeds this period.

Its resemblance to the Dog, the Wolf, and the Jackal, can scarcely be considered as sufficient to constitute it a species of the same generic group. The general form of the body, and particularly the sharp elongated muzzle, the elliptical pupil, and the full bushy tail,—all of them characteristic of every species of Fox,—do not belong to any of the true Dogs: I cannot, therefore, but consider them as generically distinct.

The figure of the Fox is slighter than that of the Wolf; but it has less of ease and suppleness in its movements. The muzzle is elongated, becoming very pointed towards the apex; the head round; the ears erect and triangular; the eyes oblique, and the pupils elliptical or nearly linear when exposed to the light of day, becoming round, or nearly so, only in the dark; the body is much elongated, and the limbs short in proportion; the tail is large, thick and bushy, and so long, that when pendent it touches the ground. The colour, though principally fulvous, is a combination of that colour with black and white, distributed in various proportions on different parts of the body. The fulvous colour predominates on the head, the back, the sides, the posterior parts of the limbs, and the sides of the tail. The shoulders are reddish grey; the throat and chest are grey; the belly, the in-

Family, PHOCIDÆ.

Amphibious: feet formed for swimming, the toes enclosed within an expansion of the integument; the posterior ones flattened, and directed backwards.

Genus, PHOCA.

Seal.

Generic Character.—Incisive teeth $\frac{3}{3}$: canines moderately long, and curved; grinding teeth $\frac{4}{4}$, with more than one root; a large point on the middle, with anteriorly one, and posteriorly two, smaller ones; external ears either wanting, or very small and inconspicuous.

THERE is not, I believe, a single group amongst the whole of the mammiferous class, which is at present so indistinctly known, and of which the species are so much confounded, as the Seals. The great general similarity of their form and habits, on the one hand, has occasioned several species to be comprised under one name; and, on the other, the great variety in colour and markings, whether accidental or as connected with difference of age, has occasionally led to the enumeration of species which do not in reality exist. Under such circumstances as these, it is certain that structural characters alone can be entirely depended upon for specific discrimination; and the more minute characters of the teeth will generally be found most available for this purpose, aided, however, by that of the colour and markings, as well as by the form of the lip, the bristles, the hair of the body, the toes, and some other circumstances. M. Frederic Cuvier has already greatly elucidated this difficult subject by his elaborate paper in the *Memoirs of the Museum*, the article "*Phoque*" in the *Dictionnaire des Sciences Naturelles*,

his work *Sur les Dents des Mammifères*, and his description of the Common Seal in the third volume of his great work on the Mammiferous Animals. In the hands of my friend Professor Nilsson, of the University of Lund, there is reason to believe that much of the confusion which still remains will be unravelled; and although until the appearance of his work, which is shortly expected, it is scarcely probable that much further light will be thrown on the general subject, it is matter of great satisfaction to me that I am enabled to increase the catalogue of British Seals, by the addition of two species, one of which, probably the Long-bodied Seal of Dr. Parsons, has been discovered on the coast of Ireland by Mr. Ball; the other has been taken in the Severn, the remains of two specimens of which are now in the Museum of the Bristol Institution.

The general habits of Seals must, from their amphibious mode of life, be but imperfectly known; it is, indeed, only when they are either reposing, or at play on the shore or floats of ice, that they can be observed; and even here their natural timidity, arising perhaps from a consciousness of the disadvantages under which they labour in their progress on land, in consequence of the peculiarity of their structure, occasions them to seek the water with the greatest precipitation on the first approach of man. In this attempt, however, they are often foiled by persons who hunt them for their skins and oil, of both of which immense quantities are obtained every year in the more northern latitudes. Their movements on the land are ludicrously awkward. They make no use of their feet in terrestrial progression, but throw themselves forwards by plunges, the anterior part of the body and the posterior being alternately applied to the ground. In this manner they make their way at a moderate pace along a tolerably even surface; but it is in the sea that

their natural activity is exercised, pursuing their active prey with great velocity, by means of their broad fin-like feet, which are admirably fitted for every kind of evolution in the water. The posterior extremities especially are excessively broad; the fingers are much spread, and united by a strong expansion of the integument; and the articulation of the numerous bones of which they are composed, is so loose and extensive, as to allow of the most free and various movements. They are either spread nearly horizontally, or the palms are turned towards each other; an arrangement which is of great importance to them as aquatic animals breathing the atmosphere, as a single impulse of these two powerful oars in a vertical direction will raise the animal towards the surface of the water, where it must frequently come for the purpose of respiration.

It is always highly interesting to investigate the various modifications of structure, which combine to fit an animal for any peculiar situation or mode of life. The Bat in its aerial flight, the Mole in its subterranean excavations, and the Horse and the Stag in their swift terrestrial course, do not exhibit more perfect instances of the adaptation of form and structure to habits, than do these animals in their aquatic life. In addition to the more obviously necessary modification of the form of the limbs, there is the smooth shining hair, which presents no obstacle to the rapid passage through the water; the thick but soft wool which closely covers the skin, preventing sudden changes of temperature and retaining the heat of the body; and the thick subcutaneous layer of fat, which not only assists in promoting the same object, but also renders the body specifically lighter, and thus brings it nearer to the relative weight of the fluid in which it usually exists; — then the nostrils, readily and totally closed at the will of the animal, preventing completely the entrance of water whilst it is submerged, and the large eye with its near-

ly spherical lens, by which its vision is adapted to the dense medium which surrounds it, complete the external character by which the Seal is enabled to pursue its finny prey, and to perform all the essential functions of life, in the midst of an element wholly unsuited for most others of the carnivorous group, and to which indeed the Otter alone offers even a remote inclination.

The teeth are also evidently formed for the purpose of seizing, holding, and partially dividing the scaly and slippery fish upon which the Seal feeds; the canines are strong, but acute; the molars beset with points of various size and form, but all adapted to their piscivorous habits: and the simple stomach is in perfect harmony with such a structure.

It has been asserted that the whole of the teeth in the Seal are developed at once, and that there is no succession of permanent to temporary teeth. I can, however, assert from the examination of several young crania of these animals, that they follow the usual law in this respect. The molar teeth of the whole of the genus *Phoca* have four points or tubercles; the large central one having one before and two behind, extremely small: in some, indeed, one or more of them are but rudimentary. The external ears are inconspicuous, and consist of a small triangular piece, which just closes the auditory passage when the animal is submerged. Their situation is peculiar. They are placed below and a little behind the eyes, so that the auditory passage passes obliquely beneath the skin to reach the internal ear. The tongue is smooth, slightly notched at the tip. The whiskers, which are very stiff and thick, appear to be of great importance as organs of touch, the slightest contact being sufficient to produce an evident sensation; each bristle, indeed, as in most of the Cats also, is supplied by a considerable nerve. The extent of the surface on which the nerves of the sense of

smelling are spread by the complicated development of the turbinated bones, is perhaps greater than in almost any other animal; but as the nostrils are always closed when the Seal is under water, it can, in this situation, only be through the medium of the mouth that the perception of odours can reach the membrane proper to receive and distinguish them.

The female of all the species, whose habits in this respect are known, brings forth but once in the year, and has but one or two at a birth, which she nourishes and protects with great tenderness and care.

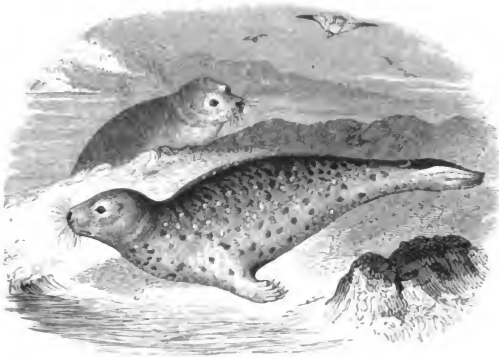
The word Seal is derived from the Anglo-Saxon 'Seol.'

The generic divisions of the family have undergone much necessary revision within the last few years, and have been established upon a more tangible basis than before, principally by the labours of the late Baron Cuvier, his brother M. Frederic Cuvier, and Professor Nilsson.

The British species belong but to three genera; *Phoca*, *Halichærus*, and *Trichecus*. The present genus, for which I retain the original name of *Phoca*, is synonymous with *Calocephalus* of F. Cuvier. It contains several species, three of which are occasionally found on the shores of these islands. These are *Ph. vitulina*, *Grænlandica*, and *barbata*; but it is exceedingly probable that future researches, on our more northern coasts especially, will greatly increase this list, as there appears to be no reason why most, if not all, the species which occur on the opposite coast of the European continent, as well as on the shores of Greenland and Iceland, should not be found amongst the islands and on the shores of Scotland. On the Dutch and French coasts there are two species nearly allied to *Ph. vitulina*, which may probably be hereafter distinguished among the numerous herds of Seals which are confounded under the name of Sea-calf, or Common Seal: these are *Ph. annellata* of Nilsson, and *Ph. leporina* of Lepechin.

That the mythologists of antiquity were indebted for the forms of some of their fabled deities, the Tritons in particular, to these animals, appears highly probable. The rounded head and the hand-like fore feet, so different from those parts in the ordinary inhabitants of the ocean, and the conformation of the fin-like hinder feet, so nearly resembling the tail of a fish, might easily suggest the idea of beings having the anterior half of the body human, and the posterior half that of a fish. Still more probable is it that the Mermaid of our own superstitions, originated in the appearance of some species of Seal on the coast;—a circumstance sufficient, in the olden time, to give rise to far more egregious violations of verisimilitude, than the conversion of such an animal into a man-fish. The origin of the superstitions of most countries is, indeed, to be sought, not in the pure invention of the ignorant inhabitants, but in the distortion of actual facts and appearances, the result either of fear, of a love of mystery and the marvellous, or of a design to impose upon the credulity of others.





COMMON SEAL.

SEA-CALF.

Phoca vitulina. Linn.

Specific Character.—Grinding-teeth placed obliquely, contiguous: fur yellowish grey, variously marked and spotted with brown.

- Phoca vitulina*, LINN. Syst. Nat. I. p. 56. MULL. Zool. Dan. Prod. p. 1, sp. 3. DESMAR. Mammal. p. 244, sp. 375. FLEM. Brit. An. p. 17. JENYNS, Brit. Vert. p. 15.
 „ *variegata*, NILBSON.
Calocephalus vitulinus, FR. CUVIER, Dict. des Sc. Nat. XXXIX. p. 544.
Phoque commun, BUFFON, Hist. Nat. XIII. p. 333, t. xlv.—Supplem. VI. t. xlv. FR. CUVIER, Mamm. tom. III. fasc. xli.
Common Seal, PENNANT, Brit. Zool. I. p. 137, No. xxxvii. SHAW Gen. Zool. I. p. 250.

AFTER much confusion and doubt, the real distinguishing characters of this, the most common species of the genus, are at length well determined. The oblique direction of the molar teeth, by which the inner posterior margin of one is in

contact with the outer anterior margin of the next behind it, is not more striking than distinctive. I am indebted to Professor Nilsson for pointing out to me this unerring character, which exists in no other known species. The form of the posterior margin of the palatal bones also constitutes a distinction of great certainty, though less valuable than the former, as it is only in prepared crania that it becomes evident. It is deeply and acutely notched; whilst in *Halichærus Gryphus* it is directly transverse, and in *Ph. Grænlandica* nearly so. The form of the nasal bones is also a character of some importance, as being invariable, and belonging to a part which is easily and generally preserved. Of these, the external process is elongated and rounded; the inner is not more than half the length of the former, and, with its fellow, forms a small triangle. The general form of the body is not very different from that of most other species of the genus; nor are there any very striking distinctive features in the structure of the head or limbs, upon which a good specific character can be founded, which should distinguish it from some others to which it is most nearly allied.

The conformation of the cranium deserves especial notice, with relation to the development of the intellectual faculties. The cerebral cavity is of very considerable extent, and the facial portion comparatively small; indicating a high degree of intelligence and docility,—a conclusion which is amply confirmed by all the facts with which we are acquainted, both of its natural manners and its acquired habits. There are numerous instances on record of the extent to which they may be rendered obedient to the commands of their master, to whom they often exhibit marks of great attachment. One of these is recorded by M. Frederic Cuvier, of a Seal which obeyed readily a number of orders which were given to it by its master, to whom it appeared to be exceedingly attached.

It would rise on its hinder feet, shoulder a stick as a musket, lie down on the right or the left side, and perform numerous other tricks. This docility of the Seal is no new discovery : the ancients were well acquainted with this trait in its character ; and Pliny, in particular, has the following passage : “ Accipiunt disciplinam, voceque paritèr et visu populo salutant, incondito fremitu : nomine vocati respondent.” * Such, there can be no doubt, are also the capabilities of the other species of this genus, to all of which, as far as I have yet had an opportunity of observing them, belongs the same extensive development of the brain. In the lower forms, on the contrary, as in the *Halichærus* and the Walrus, the cranial portion of the head is small in comparison with the facial, and a corresponding deficiency in docility and intelligence is observable.

The Common Seal appears to show no fear or anger towards man when in a state of confinement. It will suffer itself to be approached, or even touched and handled, without retreating or attempting to inflict the slightest injury. Such, however, is not the case in their natural state. If they be disturbed when on the ice or on shore, they plunge forwards as fast as their ungainly and awkward movements will permit, until they reach the margin, when they throw themselves off into the water, and instantly dive to avoid pursuit.

In the quaint language of Low, in the *Fauna Orcadensis*, “ Seals seem to have a great deal of curiosity : if people are passing in boats, they often come quite close up to the boat, and stare at them, following for a long time together ; if people are speaking loud, they seem to wonder what may be the matter. The church of Hoy, in Orkney, is situated near a small sandy bay, much frequented by these creatures ;

* Plin. Hist. Nat. l. ix. c. xiii.

and I observed when the bell rang for divine service, all the Seals within hearing swam directly for the shore, and kept looking about them, as if surprised rather than frightened, and in this manner continued to wonder, as long as the bell rung." The author adds that in North Ronaldsha they are taken for the purpose of eating, and are said to make good hams.

"The Seal (*Phoca vitulina*)," writes my friend Mr. Hogg, "frequents the extensive estuary of the Tees, and may be seen at low water basking on the sand-banks in small herds. I have always considered that they emigrate to and from the Tees' mouth, because they are much more abundant in some years than in others, and there is no established fishery for them to account for the decrease in their numbers, and few are ever known to be destroyed by man, although such a fishery would well repay the trouble and expense by their oil and skins. In some summers the great paucity of salmon, which in other years is very abundant in the Tees, gives an additional proof of the occasional increase or return of Seals, for these animals commit immense havoc among those fish. I have often been out in a boat in the Tees estuary, endeavouring to shoot a Seal, but never could succeed; for the Seal, on seeing the flash occasioned by the flint and steel of the gun-lock, instantly dived. The common Seal appears to be chiefly confined on temperate parts of Europe." The ancient Romans, amongst whom the Emperor Augustus, considered the skin of the Seal, *Vitulus marinus*, to be a protection against lightning.*

The skin and the fat of the Seal are so useful as to form an object of no inconsiderable mercantile importance; and the numbers which are annually destroyed for the sake of these products are enormous. In a good Sealing year, the

* See Suet. in Vit. Aug.—Plin. Hist. Nat. l. ii. c. lv.

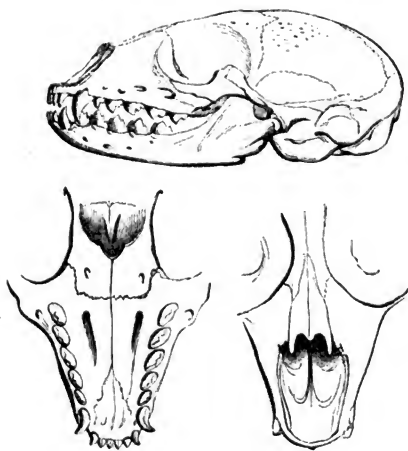
number taken on the shores and ice-fields of Newfoundland has amounted to many hundreds of thousands. They abound on the northern shores and islands of Scotland ; in the Orkney and Zetland Isles ; and are sometimes taken there in considerable numbers. Their value to the Greenlanders is inestimable. They constitute, in fact, the source of many of the necessities of life. Their flesh is used as food, the fat forms the oil for their lamps, the skins afford excellent clothing, and coverings for their boats and their temporary habitations, and these are sewn together by means of their tendons ; whilst of the thin skin of the intestines they make windows and even shirts, and the oil is held in bottles made of the maw. In this country numbers are imported on account of their oil and skins, the latter of which is either tanned and employed in making shoes, and other leather articles, or it is dressed with the fur on, and used for caps, and various articles of dress.

The name of *Ph. variegata*, given to this species by Professor Nilsson, must be abandoned, as an unnecessary alteration of an established specific name. On finding that three species had been confounded under the term *vitulina*, to one of which the name *annellata* was given by Nilsson, and to another that of *leporina* by Lepechin, the common one should still have retained the original designation. The term *vitulina* was given to this species, not on account of any supposed similarity to a calf, but because its voice was thought to resemble the voice of that animal.

The body is elongated, conical, diminishing from the chest to the tail ; neck very short ; head round ; the upper lip thick and movable, furnished with strong whiskers, which, like those of most, if not all other species, are undulated ; muzzle short ; ears marked only by a little triangular tubercle at the anterior margin of the orifice ; eyes placed nearer

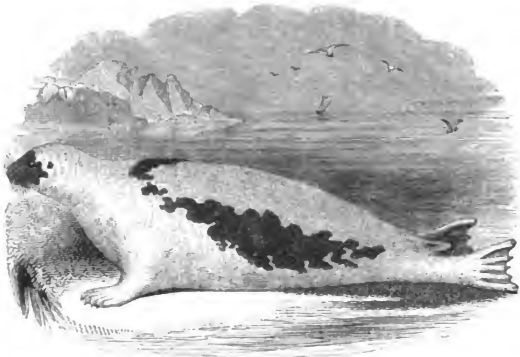
to the ears than to the extremity of the muzzle; eyebrows formed of seven or eight stiff hairs; feet very short, the claws longer on the hinder than on the fore feet; hair stiff and shining, concealing a short soft coat of woolly fur; general colour yellowish grey, with spots of brown and blackish, which are darker and larger on the head and back than on the sides; belly pale.

Length of the head and body from three to four or five feet, of which the head occupies about eight inches.



CARNIVORA.

PHOCIDÆ.



HARP SEAL.

Phoca Grænlandica. Müller.

Specific Character.—Grinding-teeth arranged in a straight series, with a small interval between them : fur (of the adult male) whitish ; the forehead, and a large crescent-shaped mark on each side, black.

Phoca Grænlandica, MÜLLER, Zool. Dan. Prod. p. viii. DESMAR. Mammal. p. 245, sp. 376. OTU. FABR. Fa. Grænland. p. 11, sp. 7.

Calocephalus Grænlandicus, FR. CUVIER, Mem. du Mus. XI. p. 186, t. xii. f. 2, d. e. f. (f. cran.)—Dict. des Sc. Nat. XXXIX. p. 546.

Phoca semilunaris, BODDAERT, Elench. p. 170.

„ *dorsata*, PALLAS, Zoograph, Rosso-Asiat.

Phoque à croissant, BUFFON, Hist. Nat. Suppl. VI. p. 525.

Harp Seal, PENNANT, Syn. Quad. p. 269. SHAW, Gen. Zool. I. p. 262, t. lxxi. GRIFFITH, An. Kingd. II. p. 506. Icon.

THERE appears in the published proceedings of the late meeting of the British Association, which was held at Bristol in August 1836, an account of the occurrence of two

species of Seal new to the British Fauna. One of these, of which my friend Dr. Riley exhibited two crania of individuals which had been taken in the Severn, was pronounced by Professor Nilsson, who was present, to be his *Phoca annellata*—the *Ph. discolor* of M. Frederic Cuvier,—which had first been figured by the latter celebrated zoologist in his *Histoire Naturelle des Mammifères*, as a variety of *Ph. vitulina*. By the kindness of Dr. Riley I am favoured with the loan of the two crania in question, and find that they undoubtedly belong to the *Ph. Grænlandica*, answering in every particular to the figures of the cranium of that species, given by M. Frederic Cuvier in his valuable paper in the *Mémoires du Muséum*; a conclusion to which Professor Nilsson also came from a further examination of the same crania whilst they were in my possession. This explanation seems to be necessary in order to account for my omission of *Ph. annellata* as a British species, after it had been announced as such, in the manner just mentioned.

That a large species of Seal has occurred, in the same or a neighbouring locality, at a remote period, is rendered very probable by the fact that there existed, long ago, a stuffed specimen of such an animal in the hall of Berkeley Castle; and it is certainly not speculating beyond the bounds of reasonable probability, to imagine that this monster might have been a specimen of *Ph. Grænlandica* from the neighbouring Severn. My friend Mr. Broderip thus calls my attention to the fact, and relates, in his own felicitous manner, the legend which belongs to it, in a letter with which he has lately favoured me. “Are you aware that there used to be in the great hall of Berkeley Castle the stuffed skin of a large Seal? The legend ran, that this was the great toad which inhabited the dungeons of the castle, and victimised the captives. Two of his own children were said to have

been sacrificed to this monster by a Marquis of Berkeley of the olden time. I well remember shuddering at first on hearing the tale from our old nurse, and afterwards venturing to dispute the truth of the story. I can see her now, with her close white cap and shaking head, reproving me for my want of faith, and settling the question, as she thought, by solemnly announcing that the skin of the toad was still to be seen at the castle."

That a species which, from its usual extreme northern locality, has received the distinctive name of *Grænlandica*, should have been repeatedly found in a latitude so remote from that of its common haunts, is well worthy of attention; and points out, on the one hand, the absurdity of giving, to marine animals especially, the name of the country where they first happened to be distinguished; and, on the other, the necessity of not being too strongly biassed by mere geographical locality in the determination of the species of such groups. They are, however, found in the greatest numbers on the icy coasts of Greenland, which neighbourhood they quit twice in the year; in the month of March to revisit it in May, and in July to return in September. They remain principally on the floating masses of ice, and thus are occasionally carried to various parts of the Northern Sea. In the same manner, it is probable that some unusual drifting of such floes of ice might have been the means of transporting the individuals which have occasionally occurred in the Severn into a more southern latitude than ordinary, from whence they made their way to that neighbourhood; for there is no reason to believe that they breed there.

Mr. Ball of Dublin, in a letter which I have lately received from him, says, "On my passage to Bristol I caught, through a telescope, a momentary glance of a Seal on the Welsh coast, which was probably another specimen [of the

Severn Seal]. It appeared to have a longer neck than I had observed in other species, as it seemed to gaze at the passing steamer. I have scarcely a doubt that there exists a fourth species of Seal on the south coast of Ireland, with a much larger head and blunter muzzle than any of the three I have alluded to [*Ph. vitulina*, *Ph. Grænlandica*, and *Halichærus Gryphus*]. In storms I have seen its black visage very conspicuous among the breakers; and a Seal-hunter told me that he had shot them in a heavy surf on a sandy beach."

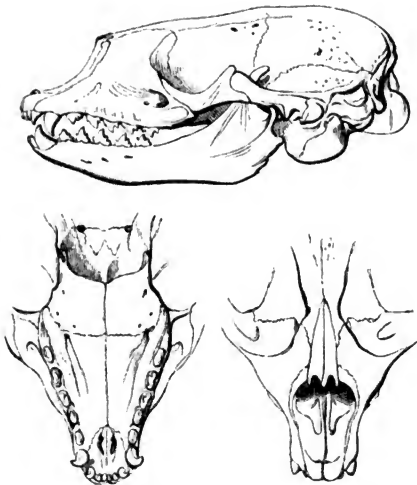
The Severn is not the only place in which this Seal has been found on the coasts of Great Britain. The cranium which is figured by Sir Everard Home in the Philosophical Transactions for 1822, appears undoubtedly to belong to this species, as was indeed suggested by Baron Cuvier in the *Ossemens Fossiles*. The following notice is given of the figure:—"The Seal was shot near the Orkney Isles by a gentleman who went two years in succession for that purpose, and afterwards gave the skeleton to Mr. Hunter. This animal had been known for thirty summers to come to the same rock, and lie basking in the sun." As the teeth, however, do not bear the mark of great age, the tubercles not being in the least degree worn, it is probable that other individuals had appeared in different years, and been mistaken for one only.

Like most other species, the Harp Seal varies considerably in its colours and markings, both from sex and age. In the first year it is stated that the skin is nearly white; in the second year it becomes grey; then it is grey with darker spots, in which state the female appears to remain; and in the fifth, the male has acquired its perfect clothing, which is greyish white, with a remarkably brown crescent-shaped mark across the back, the points of which are backwards, and directed towards each other. The muzzle is very prominent; the head depressed; bristles of the whiskers grey, slightly

compressed and undulated : the molar teeth have been said to be six on each side of each jaw ; this must, however be a mistake, as in the crania which I have seen, as well as the figures and descriptions which I have found in authors of credit, there are but five : in those of the upper jaw the anterior tubercle is obsolete. The cerebral development of this Seal, like that of *Ph. vitulina*, indicates a high degree of intelligence.

Dimensions :—

	Feet.	In.	Lines.
Total length	6	0	0
Circumference	4	0	0
Length of the cranium	0	8	3



T

CARNIVORA.

PHOCIDÆ.

GREAT SEAL.

Phoca barbata. Müller.

Specific Character.—Third toe of the fore feet longer than the others; fur blackish; teats four.

- Phoca barbata*, MÜLLER, Zool. Dan. Prod. p. viii. OTH. FABR. Faun. Grönland, p. 15. 9. DESMAR. Mammal. p. 246. sp. 378.
FR. CUVIER in Mem. du Mus. XI. p. 189, t. xii. FLEM. Brit. An. p. 18. JENYNS, Brit. Vert. p. 16.
Calocephalus barbatus, FR. CUVIER, Dict. des Sc. Nat. XXXIX. p. 547.
Great Seal, PENN. Syn. Quad. p. 341.

IN the absence of all detailed description of the Seals observed from time to time on the British coasts, and considering the near approach of most species to each other in external form, and the variations in colour which occur in the same at different ages, it becomes necessary to observe great caution in deciding on the real species to which individuals only casually observed are to be referred. On this account it is desirable that the characters of such as are at all doubtful should be made generally known, in order that those persons who have the opportunity of observing them may not satisfy themselves with a mere transient notice of their bulk and colours, but note particularly the formation of the cranium and of the teeth, the relative length of the different toes and claws of both pairs of limbs, and any other comparative character which a careful examination enables them to discover. Had this mode of investigation been adopted by those who have hitherto afforded us their observations on the species of *Phocidæ*, we should not now have

the unsatisfactory task of showing upon how slight a foundation rest most of the accounts of the occurrence of *Phoca barbata* on these coasts.

That a large species of Seal has from time to time been observed in the Orkneys, in Zetland, in the Hebrides, and various localities on the Scottish shores, and other maritime parts of the British Islands, there is sufficient evidence ; and Pennant states that he often heard of it, but never saw it. The existence of a specimen of very large size in the British Museum, which was stated to be the identical one described by Parsons as “ the Long-bodied Seal,” has always afforded a tangible authority for this belief ; but as that individual now proves to belong to another species, the *Halichærus Gryphus*, this authority is rendered nugatory. Still, however, there have been several indications of its existence, on which sufficient dependance may be placed to authorise us in enumerating it as British ; and the figures of the cranium which I now give after M. Frederic Cuvier will enable future observers to ascertain its identity more distinctly.

Low, in his *Fauna Orcadensis*, speaks of a Seal which he saw in Orkney, the length of which from the nose to the point of the hinder claws was eight feet. This, from its size, may probably have been an individual of this species. Dr. Fleming, in his work on British Animals, has the following passage :—“ The history of this species as a British subject is very imperfect. The Rev. Donald Maclean, in his account of the Parish of Small Isles,* mentions the Great Seal as a distinct species, and states that while those of the common kind bring forth their young in the middle of summer, this species does so about the middle of harvest. Dr. Edmonston, in his View of the Zetland Islands,† says,

* Stat. Ac. vol. XVII. p. 275.

† II. p. 294.

that "the head in this species is longer in proportion to the body than in the Common Seal; that they live in pairs only, and in exposed situations." In the article 'Greenland,' in the Edinburgh Encyclopædia, by Sir Charles Giesecké, it is stated that "the flesh of this species is white and good." Professor Jameson informs me, "We have at least three Seals in Scotland: the Common, or *vitulina*; the *Ph. barbata*, or Great Seal; and one of intermediate size and character, found amongst the Western Islands, but hitherto imperfectly described." This will probably prove to be either *Ph. Grænlandica*, or *Halicharus Gryphus*. Professor Jameson observes very truly, "The natural history of our British Seals requires revisal, especially what relates to form of cranium and dentary system."

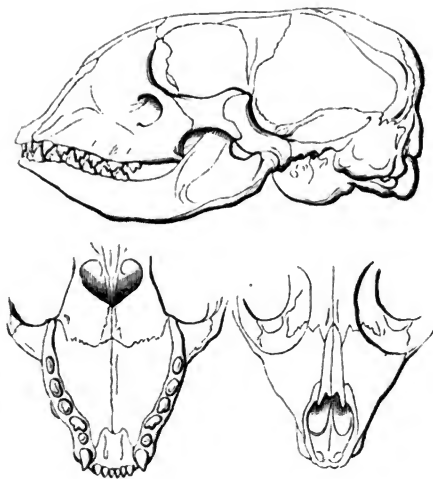
Mr. Selby states that this species "inhabits the Farn Islands, and the adjacent islands. It attains a very great size, several having been killed during this last summer which weighed upwards of forty-five stone, of fourteen pounds to the stone, and measured from ten to twelve feet in length. This species calves in the month of November upon several of the outer rocks, where the young are suckled every tide for the space of fourteen or fifteen days, when the long woolly fur which at first clothed them is cast, and a new covering of close short hair supersedes it; they are then conducted by the dam to the water, from whence they only emerge at intervals."

The teeth of this remarkable species are nearly similar to those of *vitulina*, but are not placed obliquely. The cranium is long, very broad at the back part, and the forehead remarkably arched. The muzzle is broad; the lips loose and full; the bristles of the whiskers numerous, strong, but flexible, horny, slightly compressed, smooth, and transparent; opening of the ears larger than in the other species;

eyes large, the pupil round, the iris brown ; the fore feet long, with the middle finger the longest, and the external ones the smallest and shortest—a proportion which is not observed in any other species ; body elongate, robust ; back rounded. The colour when young is smoky grey above, lighter beneath ; and the colour continues to become gradually darker, until in old age it is wholly black.

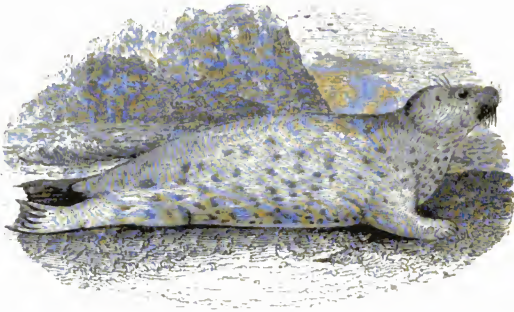
I am not acquainted with any authentic figure of this species ; that of Buffon, in the sixth volume of his Supplement, being nothing more than a copy of Parsons's figure of his Long-bodied Seal.

The general length of the whole animal appears to be about ten feet ; though some are said to have been observed of fourteen or fifteen feet.



CARNIVORA.

PHOCIDÆ.

Genus *Halichærus*. Nilsson.

Generic Character.—Muzzle very deep, obliquely truncated; head very flat: grinding teeth of the upper jaw simple; those of the lower with an obsolete tubercle before and behind the principal one.

GREY SEAL.

Halichærus Gryphus.

- | | |
|-----------------------------|---|
| <i>Phoca Gryphus</i> , | FABR. Skrivt. Naturh. Selsk. I. p. 167, t. xiii. f. 4 (cran.) |
| „ <i>Halichærus</i> , | THIENEM. Naturh. Bemerk, p. 142. 7. |
| „ <i>barbata</i> , | FLEM. Brit. An. p. 18. JENYNS, Brit. Vert. p. 16. |
| <i>Halichærus griseus</i> , | NILSSON, Skand. Fn. I. p. 577. 59. HORNSCHUCH in |
| | Isis, 1824, p. 810. LESSON, Man. de Mam. p. 204. |
| <i>Graa-hafs-skülen</i> , | NILSSON, l. c. |
| <i>Grand Phoque</i> , | BUFFON, Hist. Nat. XIII. p. 333.—Suppl. VI. t. xiv. |
| <i>Long-bodied Seal</i> , | PARSONS in Phil. Trans. XLVII. p. 121. |

THE history of this remarkable species, as a native of the British coast, requires some elucidation. For many years there has been deposited in the British Museum a large spe-

cimen of Seal, which has always been considered as the *Phoca barbata*. It was previously in the possession of Mr. Donovan, who, I am informed, stated it to be the identical specimen described under the name of "Long-bodied Seal" by Mr. Parsons, in the forty-seventh volume of the Philosophical Transactions. It has been upon his authority only that *Ph. barbata* has been catalogued as British, and it now proves to be the same species as that lately found on the southern coast of Ireland by Mr. Ball, the *Phoca Gryphus* of Fabricius, *Halichærus griseus* of Hornschuch and Nilsson. It was by the exhibition of crania of this species by Mr. Ball at the late meeting of the British Association, that Professor Nilsson, who was present, was able to identify it; and a subsequent examination of the specimen in the British Museum led that gentleman to the conclusion that this also is identical with the former. In the Bristol Institution is a specimen of a Seal which was taken in the Severn, and for the loan of which for examination I am indebted, amongst many other kindnesses, to my friends Dr. Riley and Mr. Stutchbury; and upon further examination, this also appears to belong to the same species.

I am indebted to Mr. Ball for the following interesting particulars respecting its habits and character, as well as for the sketches from which the figure was made.

"When I was quite a child, I took much pleasure in watching Seals, from the coasts of Cork and Waterford, and early became impressed with an idea that I could distinguish at least four species. Some years ago, on stating my opinions to some zoological friends, I was induced to set about collecting specimens and information from various parts of the coast. For a considerable time I procured only one species; and finding this labelled in our museums as *Phoca vitulina*, I took it for granted that it was so, until I pro-

cured a cranium of a very different species from Sligo, which on examination I found to belong to the true *Ph. vitulina*. I then sought to ascertain to what species the former specimens belonged; and, kindly aided by Dr. Scouler, searched in vain all the authorities to which we could get access. Failing to obtain information, I was induced to bring the matter before the British Association; when Professor Nilsson recognised the crania I produced as those of the Seal described by him as *Halichærus Griseus*, *Ph. Gryphus* Fab.

“ My observations on the habits of the animal do not altogether accord with those of the learned professor, who stated that it was solitary in the Baltic, whilst here I have seen it often in small parties, and learned from fishermen that they have noticed as many as thirteen congregated on a rock. I may remark, that to observe Seals on a populous coast requires great patience, and a practised eye; for the animals are much on the alert; and experience seems to have taught them the prudence of retiring to their caves, or going out to sea, on the approach of man: so that unless surprised, or discovered from a distance and cautiously advanced on, an observer has little chance of getting near them.

“ Colour, in the present instance, appears to be a character of little value; for in the many specimens I have seen of both sexes and of all ages, I do not remember that any two were precisely similar. The very young females seem to be generally of a dull yellowish white, with rather long hair, which falls off in about a month or six weeks, and gives place to a shorter and more shining coat, variously blotched with blackish grey: this is brighter at first, and gradually grows more dull, and the blotching more indistinct on the upper parts, as the animal advances in age; whilst on the breast and lower parts the blotches in some specimens show almost as distinctly as the spots on a Leopard. From a peculiarity in

the hair of the adult, it being considerably recurved, and as if its upper surface were scraped flat with a sharp knife, the animal, when dry, and with its head turned towards the spectator, appears of a uniform silvery grey, whilst viewed in the opposite direction it appears altogether of a sooty brown colour; the spots or blotches being only visible on a side view. The only male specimen I possess died young: it has long yellowish hair, slightly tinged with brownish black on the back; it is black on the muzzle, chin, and cheeks, extending round the eyes, but not to the upper part of the nose; and the palms of the fore paws are black.

“ My father has made several attempts to rear and tame this Seal, but in vain. It appears scarcely susceptible of domestication, and the development of its skull seems to indicate as much; for the size of the brain of a specimen nearly eight feet long did not exceed that of one of *Phoca variegata* (*vitulina*) of less than four feet. The head and general form of *Halichærus* are long in proportion to its rotundity, comparatively with other Seals.

“ On examining the remains of Donovan's *Ph. barbata*, now in the British Museum, I recognised in it an ill-put-up specimen of our *Halichærus*; and I presume the stuffer has endeavoured to make the specimen correspond with the description of *Ph. barbata* by unduly plumping up the snout and shortening the thumbs, which are evidently pushed in by the wires intended to support the paws. Sir Everard Home figured, in the Philosophical Transactions of 1822, a cranium from a drawing belonging to Mr. Hunter, of ‘ the skull of the Great Seal deposited in the British Museum from the South Seas.’ I suspect that there is some mistake in the reference of the letter-press to the figure; and the reference in Griffith's Cuvier seems also incorrect. Could the skull from which the figure is taken have belonged to Donovan's Seal?

I have a similar skull from a similar Seal that I killed myself, and feel much inclined to believe it did.

“I find that the palatal foramina furnish a good character; for while in *Halichærus* they open in or on the palatal bones, they in several species of *Phoca* open in the maxillaries. This is a character of value, as it is not influenced by age. The hairs of the whiskers in this species are flattened in one direction, and contracted at regular intervals in the other; so that when viewed in front they appear linear, when seen sideways they are moniliform. Their colour varies from whitish horn colour to blackish.

“It occurred to me several years since that I could kill Seals by going to the mouths of their caves, and striking them with a harpoon as they dived out. Acting on this, in August 1829 I went to Howth properly equipped, and took a position at the mouth of a cave, in which I could hear the inmates baying loudly like large Dogs. On making a noise from the boat, several Seals passed out with great velocity, at the depth of about eight feet: one I struck with an oar, and another with a harpoon, but not effectually, as it gave way after a short struggle. Learning from the failure, we made ready for the next, which I could distinctly see at the bottom of the water attentively watching us, sometimes advancing and again retreating: it seemed scared by the harpoons, which the friend who aided me and I held so deep in the water as only to offer it room to pass. After a considerable time so spent, we raised our weapons a little, when it made a start to escape, but in vain, as both our harpoons struck it, mine penetrating even to its heart. It twisted the shaft out of my hands, and broke it short off, though between two and three inches in diameter; it then pulled our boat out to sea, and when compelled to come to the surface, we fired four shots into it before it ceased violent exertion. The quan-

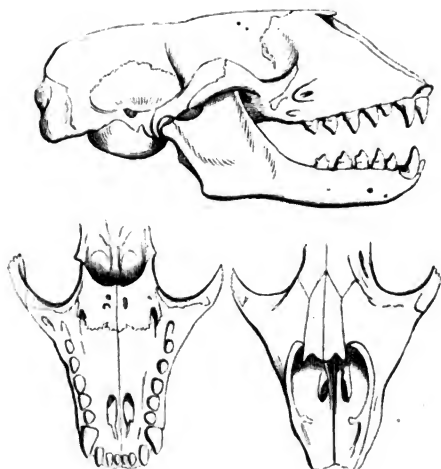
tity of blood was enormous, spreading to a great extent on the surface of the water. I estimate the weight of the animal, though in poor condition, to have been upwards of five hundred pounds; its skeleton now measures seven feet two inches; it was a very aged female, judging from the state of its teeth, yet it appeared to be suckling young, as there was milk in its mammæ."

To this full and interesting account there is little to be added. It is impossible not to be forcibly struck with the contrast between the cerebral development in this genus, and that of the true *Phoca*, and the relation between this difference of structure and their susceptibility of domestication. It is exactly analogous to the distinction between the crania of baboons, and those of the higher groups of quadrumanous animals. The predominance of the face over the cranium in *Halichærus*, and the extreme narrowness of the latter part, exhibit, when taken in reference to the intellectual faculties, a striking corroboration of the law which assigns to the relative proportions of these two parts of the head a corresponding relation between the mental powers and animal propensities. Hence, as Mr. Ball testifies, the present species is not susceptible of domestication; whilst the Common Seal, as is well known, is docile to an extraordinary degree.

But this conformation of the cranium in the present genus is interesting in another point of view: it exhibits an obvious passage from the higher forms of the family towards the Walrus—an animal in which the development of the face, as compared with the cranium, is enormously large; and although perhaps another intermediate form may yet be supposed necessary to render the chain of affinities complete, the indications in the present instance are far from being obscure.

The toes of the hinder foot, or flipper, diminish in the

following order : the first is the longest ; then the fifth, the second, the fourth ; and the middle one is the shortest. The grinding teeth differ from those of the true *Phocæ*, in the absence, at least in most of them, of any small tubercle. In the upper jaw, the first is a very small, single-pointed tooth, the point slightly recurved ; the three following of nearly the same form, but larger ; and the fifth has a minute rudimentary tubercle at the back part. In the lower jaw, the first and third are similar to those of the upper ; the second broad, and having a rudimentary tubercle before and behind ; the fourth and fifth, with the tubercles distinct.



CARNIVORA.

PHOCIDÆ.

Genus, *Trichecus*. Linn.

Generic Character.—Incisive teeth, two in the upper jaw, deciduous ; canines, one on each side in the upper jaw only, extremely large, directed downwards ; molar teeth, $\frac{4}{3}$ or $\frac{5}{3}$, obtuse and simple.

WALRUS.

MORSE, SEA-COW, SEA-HORSE.

Trichecus Rosmarus. Linn.

Trichecus Rosmarus, LINN. Syst. Nat. I. p. 49. MULL. Zool. Dan. Prod. p. 1, sp. 1. FABR. Fn. Grœnl. p. 3. DESMAR. Mammal. p. 253, sp. 388. FLEM. Brit. An. p. 18. JENYNS, Brit. Vert. p. 16.

Arctic Walrus, PENN. Syn. Quad. p. 266, sp. 468, t. xevii. SHAW, Gen. Zool. I. p. 234, t. lxviii. lxix.

Morse, ou Vache marine, BUFFON, Hist. Nat. XIII. p. 358, t. liv.

OF the occurrence of this extraordinary animal on the coasts of Britain, we have but few and unsatisfactory ac-

counts. The earliest statement upon which any dependance can be placed is that of Hector Boëce, in his History of Scotland, whose authority is copied by Sir Robert Sibbald. It can, however, be considered but as an occasional and very rare visitant to our shores, as two subsequent instances only are recorded of its appearance. "In December 1817," says Dr. Fleming, in his History of British Animals, "a solitary individual was shot while lying on a small rock at the Sound of Stockness, on the east coast of Harris, which was upwards of ten feet in length: the tusks measured eight and a half inches in length." The other was killed in Orkney in June 1825.

Buffon says, that Evrard Worst saw in England a living Morse three months old, which would follow its master to be fed, though with great effort, and very slowly. It appeared not to be materially incommoded by the heat of the climate; but, on the contrary, had the aspect of robust health. Its defences, or canine teeth, had not yet made their appearance; but there were in the upper jaw large protuberances, from which they were to issue.

The form of this animal is extremely unwieldy; its bulk, in comparison with its length, being greater than in any other form of the *Phocidæ*. This, with the relative small size of the head—the full, thick muzzle, and the long tusks directed downwards, give it a most strange appearance. Like the Seals, it frequents principally the Northern regions, where multitudes of them associate in herds, on the rocks or ice-fields, throwing themselves off on the first approach of danger into the sea, where they are as active and as much at home as the Seals themselves. The Walrus, however, from the form and structure of its teeth, cannot live upon fish to the exclusion of vegetable food. The small number of grinding-teeth, and more especially

their extreme shortness and rounded form, are calculated rather to bruise the half-pulpy mass of marine vegetables, than to hold and pierce the slippery hardness of the fish's scaly cuirass.* One of the most remarkable peculiarities is the form and size of the superior canine teeth, which are directed downwards, and are extremely long and powerful, constituting a pair of defences of immense strength.

The Walrus is found only in the colder regions ; it comes often on shore or on the ice, and remains there sometimes in herds of forty, eighty, a hundred, or more, for days together, until they are driven to the sea either by alarm or hunger. They are often killed on land at Spitzbergen, and other northern coasts, by means of a lance or spear, for the sake of their oil, and the ivory of their tusks, which is much more valuable than that of the Elephant, on account of its superior whiteness and density. Of late years, the pursuit of these animals has greatly diminished their numbers, or, at least, taught them more caution, and rendered them extremely fearful of their arch enemy. In the water, the chase of the Walrus is exceedingly difficult. The extreme thickness and hardness of their skin render it impervious even to the stroke of the harpoon, unless well directed and sent with great force.

Before the persecution above alluded to had taught them the danger to be apprehended from the approach of mankind, they were often found at a considerable distance from the sea ; and as the hunters placed themselves between them and

* This view of the aliment of the Walrus, derived from the character of the teeth, is amply confirmed by the following observation in Sir Everard Home's paper on the Walrus, in the Philosophical Transactions for 1824 :—"I am informed by my friend Mr. Fisher, who was astronomer in the two last voyages, that he was present when the contents of the stomach of a Walrus were examined : they consisted entirely of the long branches of sea-weeds, *Fucus digitatus*, which is very abundant in the Arctic Seas, especially in those parts where the Walrus is met with in the greatest numbers.

the water, numbers were intercepted in their retreat, and readily destroyed. Of the carcasses of the first that fell, the hunters made a sort of barrier to oppose the retreat of the remainder; and in this way, on some occasions, as our author declares, three or four hundred have been killed. When wounded they become furious, striking from side to side with their long tusks, seizing and breaking asunder the weapons with which they are attacked, and at length, placing the head downwards between the fore paws, roll themselves like an immense ball into the sea.

The knowledge of this chase, says Pennant, is of great antiquity; Oether the Norwegian, about the year 890, made a report of it to King Alfred, having, as he says, "made the voyage beyond Norway for the more commoditie of fishing of Horse-whales; which have in their teeth bones of great price and excellencie, whereof he brought some on his return unto the king."—*Hakluyt's Coll. Voy.* I. 5.

The above quotation leads to some observations upon the etymology of the different names which have been given to this animal. *Horse-whale* is a literal translation of *Whal-ros*, in Norwegian *Hval-ros*. *Rosmar*, another Norwegian name, appears to be a compound of the Teutonic *Ros*, horse, and the Latin *mare*, the sea. *Morse* is from the Russian *Morss*; the Lapponic name being *Morsk*.

The female brings forth in the winter, either on the shore or on the ice, and generally produces but one young one, which, at its birth, is about the size of a Pig of a year old.

The head of the Walrus is comparatively of moderate size, rounded, very obtuse, and as it were tumid in front; the bristles of the whiskers flattened, being nearly a line in breadth by one-third of a line thick at their origin; mouth rather small, armed with a pair of enormous canine teeth directed downwards and bent very slightly backwards, the

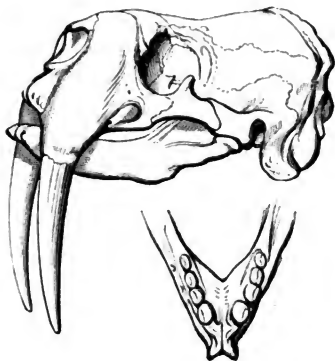
usual length of which is from eight to fourteen inches, though in aged males they sometimes exceed two feet; of which extraordinary size are a pair from Spitzbergen, given me by my friend Dr. Ashwell, in which I observe a slight twist of the teeth, which I have not seen in any of smaller growth;—they are no less than six inches and three-quarters in girth. This is the only specimen in which I have seen any incisive teeth remaining. They are one on each side, extremely small and short, without any root, merely fixed to the gum, the bone being scarcely even hollowed for their reception. In all macerated skulls they are wanting, as they come away with the soft parts. The molar teeth are round, short, obliquely truncate, generally four on each side in the upper jaw, though originally a fifth exists, which appears to be early deciduous. In numerous crania which I have examined, I have never found these rudimentary molar teeth—nor, with the exception just mentioned, even the incisors. The existence in this animal of the normal number of the grinding teeth of the *Phocidæ* is interesting.

The eyes are small and bright; the orifices of the ears placed far back, and without any external conch; the body, which is very thick and bulky about the chest, becomes gradually smaller towards the tail, as in the true Seals, but the bulk is much greater in proportion to the length than in those animals; the neck is very short, as is also the tail; the skin is smooth, very thick, of a blackish colour, with a very few short stiffish brown hairs, principally on the feet; posterior feet extremely broad; the female has four ventral teats.

Some years since, Sir Everard Home endeavoured to show that the flippers or hinder feet of the Walrus were intended to form a sort of sucker, by which the animal might be enabled to adhere to the slippery sides of the ice, and in that

way to raise itself to the top. There appears, however, to be no ground in the anatomy of this part for any such opinion.

The figures which are ordinarily given of the Walrus, are mere copies or modifications of the beautiful, but erroneous plate, in the illustrations to Cook's Voyages, which conveys an idea of a far more bulky and unwieldy animal than it really is, and in which all resemblance to the Seals is lost. The figure which I have placed at the head of this account is taken from an original drawing by Howitt, in my possession : it is probably much more correct than any other extant, and exhibits a more striking view of its relations to the other forms of the family.



RODENTIA.

SCIURIDÆ.

Genus, *Sciurus*.

SQUIRREL.

Generic Character.—Clavicles complete; grinding teeth $\frac{4}{4}$, simple, the summits tubercular, the anterior one in the upper jaw extremely small; upper incisive teeth chisel-shaped, lower ones pointed, compressed laterally; toes long and free; tail long and bushy.

COMMON SQUIRREL.

Sciurus vulgaris. Linn.

Specific Character.—Brownish red above, white beneath; tail very bushy, of the same colour as the body; ears tufted.

Σκίουρος.

OPPIAN, Cynege.

Sciurus,

PLIN. Hist. Nat. lib. VIII. c. xxxviii.

„ *vulgaris*, LINN. Syst. Nat. I. p. 86. MULL. Zool. Dan. Prod. p. 5, sp. 32. DESMAR. Mammal. p. 330, sp. 527. FLEM. Brit. An. p. 20. JENYNS, Brit. Vert. p. 29.

Common Squirrel, PENN. Brit. Zool. I. p. 107. SHAW, Gen. Zool. II. p. 134.

Ecureuil commun, BUFFON, Hist. Nat. VII. p. 253, t. xxxii. FR. CUVIER, Mammif. Livr. xxii.

THE form and habits of this elegant and active little creature combine to render it one of the most beautiful and

entertaining of our native animals. Its movements are agile ; its conformation and colours elegant and pleasing ; its disposition, when early domesticated, gentle, playful, and familiar. Dwelling principally upon trees, and rarely descending to the ground, it leaps from bough to bough with astonishing agility. It lives upon nuts, acorns, beech-mast, the bark of young trees, leaf-buds, and tender shoots. In eating nuts, it gnaws with considerable rapidity through the hard shell, and then carefully removes every particle of the dry brown skin from each morsel of the kernel before it is eaten. It sits upon its haunches, holding its food in its fore-paws, which serve the office of hands. In taking its leaps, when once thrown off by an effort of its long and powerful hinder legs, it is in a measure sustained by the horizontal spreading of its limbs and bushy tail ; which latter organ is also extremely useful in covering and protecting its back, over which it is often turned, and in enveloping the whole lateral and dorsal parts of the body when coiled up during sleep or in its hibernation. It lays up stores of food for its winter provision, which is not usually deposited in a single place of safety, but distributed in several different holes of trees, in the immediate neighbourhood of its own retreat. It remains during the greater part of the winter in a state of almost complete torpidity,—coming abroad, however, on the occurrence of a fine day, feeding on a part of its treasured hoards, and then retiring again to its slumbers. According to Pliny, the Squirrel closes its retreat on the side from which the wind is likely to blow, and opens it on the opposite direction. “*Prævident tempestatem et Sciuri ; obturatisque, qua spiraturus est ventus, cavernis, ex aliâ parte aperiunt fores.*” *

A pair of Squirrels, for they are monogamous, do not readily change their place of abode, but remain attached for

* Plin. Hist. Nat. lib. VIII. c. xxxviii.

a long period to the same tree, seeking their food in the district immediately surrounding it. The nest is constructed in a very intricate and beautiful manner, of moss, leaves, and fibres, curiously interlaced; and is usually placed either in a hole in the tree, or in the fork between two branches, where it can with difficulty be distinguished from the tree itself. The female brings forth three or four young in the month of June, which receive the most assiduous care from both parents, and remain with them until the following spring, when they separate, and choose their mates.

The Squirrel is liable to considerable variety in point of colour, becoming grey in the northern regions. Linnæus, in his *Lachesis Lapponica*, states that the inhabitants of the Lapland Alps "contrive, by means of their wooden bows, to procure in the course of the winter a considerable number of Squirrels (*Sciurus vulgaris*) in their grey or winter clothing, for the sake of their skins."* Even in this country it appears that a certain degree of change takes place in the colour of the fur in spring and in autumn. Mr. Blyth first informed me of this fact, and states that in the summer the fur is much coarser, and more uniformly red; the pencils of the ears also are lost, as has been observed by former naturalists; in the winter the sides of the body assume a greyish tint, the pencils of the ears are long and full, and the fur softer and fuller. The summer change is not perfect till July.

The head is thick, rounded posteriorly, flattened at the sides and on the forehead; the nose prominent; the eyes black, prominent, large, and placed rather high on the sides of the head; the ears straight, large, terminated by a pencil of long hairs; the cutting teeth of the upper jaw broader than those of the lower, which are almost pointed, and much flattened at the sides; the grinding teeth are four above and below,

* *Lachesis Lapponica*, translated by Smith, II. p. 49.

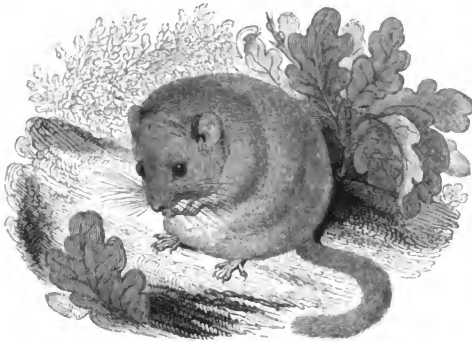
with the addition of a rudimentary one, consisting of a single tubercle, and often deciduous, placed immediately before the others in the upper jaw ; the neck is short, but distinct ; the body thick ; the back arched ; the tail long and very bushy, the hairs being distichous ; hinder legs very long, the heels touching the ground ; the fore-feet formed for holding food ; the fingers long, furnished with prominent cushions, and with long sharp curved claws. The colour above is reddish brown, beneath white. Dimensions :—

	Inch.	Lines.
Length of the head and body	8	6
„ of the head	2	0
„ of the ears	0	9
„ of the tail to the end of the bone	6	3



RODENTIA.

SCIURIDÆ.

Genus, *Myoxus*. Schreber.

Generic Character.—Grinders $\frac{4}{3}$, simple, the summits marked with transverse ridges of enamel; tail long, somewhat bushy.

COMMON DORMOUSE.

SLEEPER.

Myoxus avellanarius. Desmar.

Specific Character.—Fur light tawny above, paler and yellowish beneath; the throat white; tail about the length of the body.

Mus avellanarius minor, RAY, Syn. Quad. 220.

Mus avellanarius, LINN. Syst. Nat. p. 83, No. 14. PALLAS, Glir. p. 89.

Sciurus avellanarius, ERXLEB. Syst. p. 433, 15.

Myoxus muscardinus, SCHREBER, Säugth. p. 835, 4, t. ccvii.

„ *avellanarius*, DESMAR. Mammal. p. 295, sp. 466. FLEM. Brit. Anim. p. 22. JENYNS, Brit. Vert. p. 30.

Le Muscardin, BUFFON, Hist. Nat. VIII. p. 193, t. xxvi. FR. CUV. Mammif. fasc. XXXVIII.

Dormouse, PENNANT, Brit. Zool. I. p. 110. SHAW, Gen. Zool. II. p. 167, t. cliv.

THE situation of the genus *Myoxus* in the natural arrangement of the *Rodentia* is one of some interest, as indi-

cating the passage from the typical *Sciuridæ*, or Squirrels, towards the *Muridæ*, or true Mice. In its climbing and prehensile habits, and the character of the tail, as well as in the form and structure of the teeth, this intermediate character is very obvious. Inhabiting dense shrubs and thickets—building its nest amidst the foliage of the underwood of coppices, or in the tangled vegetation of hedgerows,—feeding upon corn, haws, young hazel-nuts, and fallen acorns,—laying up a hoard of provision for the winter, and assuming an almost total torpidity during that ungenial season,—its habits are clearly intermediate between the two families alluded to; and the structural characters offer no less valid reasons for this view of its natural affinities. The teeth departing from the tubercular type offered by the true Squirrels, indicate, in the arrangement of the enamel, a considerable approach to the *Muridæ*: the rudimentary anterior grinding tooth of the lower jaw, which is characteristic of the true Squirrel, and of those genera most nearly allied to them, is here wanting. The tail in the *Myoxus glis*, a common species in the south of Europe, is nearly allied to that of Squirrels; but that of our native species is farther removed from it, although still somewhat bushy, and having the same distichous arrangement of the hairs. The claws, too, although prehensile, are much less strongly so than in the Squirrels; and, in short, its whole organisation, combined with its mode of life, is so equivocal as to leave no doubt as to its osculant character between these two distinct types—in each of which, indeed, it has been placed by different naturalists; thus, the Common Dormouse is a *Mus* of Linnæus and of Pallas, and a *Sciurus* of Erxleben.

Although extremely gentle and inoffensive, and easily rendered familiar when in confinement, it chooses its habitation far from the haunts of man, and, from its retiring and

nocturnal habits, is not easily observed and taken. It is found in the localities indicated above, where little colonies are sometimes seen inhabiting a space of no considerable extent. My friend Mr. Yarrell informs me that he has seen not less than ten or a dozen, or even more, of their nests, built in the shrubs of a thicket. It takes its food holding it in its hands, and sitting on its haunches like a Squirrel, and often suspending itself by its hinder feet, in which position it feeds as easily and comfortably as in the more ordinary position. Towards the winter it becomes exceedingly fat; and having laid up a store of food, retires to its little nest, and coiling itself up into a ball, with the tail over the head and back, becomes completely torpid. A mild day calls it into transient life: it then takes a fresh supply of food, and relapses into its former slumber; and finally awaking in the spring, at which time it has lost much of its fat, it enters upon its usual habits, and the enjoyment of the conjugal and parental affections. The young, which are generally about four in number, are born blind; but in a few days the eyes are opened, and in a short time they are able to seek their food independently of the parents' care. I have reason to believe that, in some cases at least, the Dormouse has a second brood early in the autumn, as I have received from one locality in the month of September an adult, one about half-grown, evidently of the spring brood, and three very young ones, apparently not more than a fortnight or three weeks old. The young Dormouse is at first of a mouse-grey colour, the head and flanks alone having a reddish tinge: by degrees the grey disappears, and gives place to the delicate reddish brown of the adult garb; but it is not until the following spring that this change is completed. The young ones enter into their hibernation much more tardily than the old ones. In one instance an

adult became torpid about the middle of October; one of the spring brood, about six weeks afterwards; and those born in autumn died early in the winter without having ever attempted hibernation,—and although they had continued to feed, they died extremely thin. The name *avellanarius* is not well chosen, as the principal food of the Dormouse does not certainly consist of the hazel-nut: indeed, I have never seen any that could gnaw through the shell of that nut when fully ripe and dry.

The head of the Dormouse is rather large for the size of the animal; the eyes black, large, and prominent; the forehead raised; the muzzle rather pointed; the ears rather more than one-third the length of the head; the body rounded and full; the tail flattened, nearly linear, furnished with rather long hairs, which stand out on each side; the fore-feet with four toes and the rudiment of a thumb, the hinder with five toes. Dimensions:—

	Inch.	Lines.
Length of the head and body	2	8
„ of the head	0	11
„ of the ears	0	4
„ of the tail	2	6

RODENTIA.

MURIDÆ.

Genus, *Mus*.

MOUSE, RAT.

Generic Character.—Grinders $\frac{3}{3}$, simple, with tubercular summits; superior incisive teeth wedge-shaped, inferior ones compressed and pointed; tail nearly naked, annulated with scales.

HARVEST MOUSE.

Mus messorius. Shaw.

Specific Character.—Fur light reddish brown on the upper parts, white beneath, the two colours distinctly circumscribed; ears one-third the length of the head.

Mus messorius, SHAW, Gen. Zool. II. p. 62, fig. in titul. MONTAGU in Linn. Trans. VII. p. 274. DESMAR. Mammal. p. 302, sp. 479. FLEM. Brit. Ad. p. 19. JENYNS, Brit. Vert. p. 31.

„ *minutus*, PALLAS, Glir. p. 96, 45. ERXLEB. Syst. p. 401, 11. GMEL. Linn. Syst. Nat. I. 130. DESMAR. Mammal. p. 304, sp. 485.

Mulot nain? FR. CUVIER, Mammal. II.

Rat des Moissons, „ „ „ IV.

Harvest Mouse, PENN. Brit. Zool. I. p. 120, No. 29.

Minute Mouse, SHAW, Gen. Zool. II. p. 64, t. cxxxi.

ALTHOUGH it is certainly to Gilbert White that we owe the first published account of this elegant little animal as indigenous to this country, it appears to have been seen,

though without exciting due attention, by Montagu, who, in the seventh volume of the Linnean Transactions, records his having seen it in Wiltshire before the discovery of it in Hampshire by the former naturalist. White communicated his discovery to Pennant, who immediately published it, with the acknowledgment of his authority, in the second edition of his *British Quadrupeds*; and again in the subsequent editions, without that acknowledgment. From this source it has been copied into almost every subsequent work on British mammalia, and with but little addition to our knowledge as to its habits, with the exception of Montagu in the place alluded to, Bingley in his *Animal Biography*, and Dr. Gloger in the *Transactions of the German Academy*, who have thrown much light upon many interesting points in their economy, both in a state of nature and in confinement. The most complete epitome of the information thus scattered, is to be found in a note to the recent edition of White's *Selborne*, by my lamented friend Mr. E. T. Bennett, whose loss at the moment of its completion has shed a gloom over the appearance of that delightful book, which he has so much enriched with his varied and extensive information.

The Harvest Mouse has now been found in various parts of England; in Hampshire, Wiltshire, Gloucestershire, Devonshire, and Cambridgeshire,—in the latter of which counties my father saw it not less than seventy years ago, and has described it to me as a third species of Field Mouse. It has also been found in Germany, and in Russia and Siberia. It is commonly carried in sheaves of corn into wheat-ricks or into barns, and lives and multiplies in such situations with great rapidity. It feeds principally on corn; but from the observations of Mr. Bingley, it would appear that it occasionally feeds, nothing loath, upon insects also.

"One evening," says this agreeable writer, speaking of an individual of this species which he had in confinement, "as I was sitting at my writing-desk, and the animal was playing about in the open part of its cage, a large blue fly happened to buzz against the wires. The little creature, although at twice or thrice the distance of her own length from it, sprang along the wires with the greatest agility, and would certainly have seized it, had the space between the wires been sufficiently wide to have admitted her teeth or paws to reach it. I was surprised at this occurrence, as I had been led to believe that the Harvest Mouse was merely a granivorous animal. I caught the fly and made it buzz in my fingers against the wires. The Mouse, though usually shy and timid, immediately came out of her hiding-place, and running to the spot, seized and devoured it. From this time I fed her with insects, whenever I could get them; and she always preferred them to every other kind of food that I offered her."

It is not only one of the prettiest, but without exception the smallest, of all the British mammalia; and its habits are at least as interesting as those of many more conspicuous and important species. Although not very easily rendered familiar, being in this respect much inferior to the Common Field Mouse, it may be kept in confinement for a long time in good health, by allowing it the optional use of a sort of little tread-wheel, in which it will often exercise itself, apparently to its amusement and satisfaction; and it was probably from the absence of this healthful exercise that Montagu failed to keep it in confinement. It was observed by the Rev. Wm. Bingley, that the tail of this species is prehensile,—a fact which has subsequently been alluded to by Mr. Broderip, in the fifth volume of the Zoological Journal.

It appears to retire, like other Mice, to little burrows during the winter months : but it also remains the whole of this season in ricks of corn, in which situations, according to the testimony of more than one writer, it does not become torpid, as it does when hibernating under ground. Its beautiful little round nest, of which a representation is given in the vignette at the foot of this description, was first described by White as being "most artificially platted, and composed of the blades of wheat ; perfectly round, and about the size of a cricket-ball, with the aperture so ingeniously closed, that there was no discovering to what part it belonged. It was so compact and well filled, that it would roll across the table without being discomposed, though it contained eight little Mice that were naked and blind. As this nest was perfectly full, how could the dam come at her litter respectively, so as to administer a teat to each ? Perhaps she opens different places for that purpose, adjusting them again when the business is over : but she could not possibly be contained in the ball with her young, which, moreover, would be daily increasing in bulk. This wonderful 'procreant cradle,' an elegant instance of the efforts of instinct, was found in a wheat-field suspended in the head of a thistle." Dr. Gloger describes its nest still more particularly ; and as I have not seen his paper, I extract the following account from Mr. Bennett's quotation of that naturalist's observations.

"It was beautifully and elaborately constructed of the panicles and leaves of three stems of the common reed interwoven together, and forming a roundish ball, suspended on the living plants at a height of about five inches from the ground. On the side opposite to the stems, rather below the middle, was a small aperture, which appeared to be closed during the absence of the parent, and was scarcely observable even after

one of the young had made its escape through it. The inside, when examined with the little finger, was found to be soft and warm, smooth, and neatly rounded, but very confined. This nest contained but five young: but one less elaborately formed, previously examined by Dr. Gloger, was found to afford shelter to no less than nine. The panicles and leaves of the grass were very artificially woven together, the latter being first slit by the action of the little animal's teeth into more or less minute bands or strings. No other substance was used in the construction of the nest, which was altogether without cement, or any means of cohesion save the interweaving of its component parts: it consequently suffered considerable disturbance even from the most careful handling, losing in neatness of form as much as it gained in its increasing size." *

This little animal probably breeds during a considerable portion of the year, in favourable situations; and as it brings from five to eight, or even nine young at a time, its increase would be immense did it not prove an easy victim to every beast and bird of prey. In those instances in which it has brought forth its young in confinement, it appears that the mother has speedily killed and partly eaten her offspring.

The propriety of considering the *Mus minutus* of Pallas as identical with White's species was apparent to Shaw, and is also urged by Montagu. Fischer, too, in his Synopsis, has this note:—"An reverà à *M. minuto distinctus*?" In the description there is not a single character that does not appertain to both, and I believe there can be no doubt of their identity;—an opinion in which Mr. Bennett appears to have fully agreed. It is very probably also the *Mulot nain* of M. Fr. Cuvier, described in the second volume of his *Histoire Naturelle des Mammifères*.

* White's Selbourne, by Bennett, p. 58, note.

The general form is rather more elongated and slender than that of most of the genus; the head rather narrow; the eyes are less prominent than in the Common Field Mouse, black; ears about one-third the length of the head, rounded; tail rather shorter than the body. Fur above of a reddish brown colour, rather brighter than that of the Dormouse; the hair being dusky at the base, and red towards the point: the under parts pure white; the two colours being separated by an abrupt line.

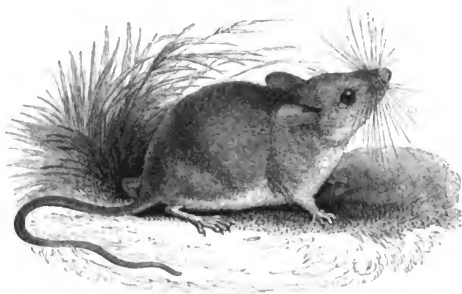
Dimensions :—

	Inch.	Lines.
Length of the head and body	2	6
„ of the head	0	10
„ of the ears	0	3
„ of the tail	2	5



RODENTIA.

MURIDÆ.



LONG-TAILED FIELD MOUSE.

WOOD MOUSE.

Mus sylvaticus. Linn.

Specific Character.—Reddish brown above, whitish beneath, with a light brownish spot on the breast; ears more than half the length of the head; tail nearly as long as the head and body.

Mus sylvaticus, LINN. Syst. Nat. I. p. 84, 17. ERXLER. Syst. p. 388, 4.
 DESMAR. Mammal. p. 301, sp. 477. FLEM. Brit. An.
 p. 19. JENYNS, Brit. Vert. p. 30.

„ *agrestis major*, BRISS. Reg. An. p. 171, 4.

„ *domesticus medius*, RAY, Syn. p. 218.

Le Mulot, BUFFON, Hist. Nat. VII. p. 325, t. xli.

Long-tailed Field Mouse, PENN. Brit. Zool. p. 120, No. 28.

Wood Mouse, SHAW, Gen. Zool. II. p. 58, t. cxxxii.

THIS common species is scattered over almost the whole of the temperate regions of Europe, and in every part is considered as one of the most destructive of all the minor pests of the corn-field, the nursery-ground, and the kitchen-garden. Multiplying in hosts, and each one laying up a

winter store in its subterranean retreat, the devastations committed by it are almost incalculable. It is, however, a gentle and timid little creature ; easily tamed, and rendered perfectly familiar. I have seen several of them running out upon the breakfast-table of my late most valued friend Dr. Leach, of whose kind and affectionate disposition they appeared to have an almost instinctive perception, as they would feed from his hand, or from his plate, without the least fear, and allow him to handle and play with them as freely as the Dormouse. Its retreat is formed under ground, either in holes formed by its own labour, or more frequently in small natural excavations under the trunks or roots of trees, enlarged by themselves, or in the deserted runs of the Mole. The quantity of food which is here hoarded is astonishing : it consists of acorns, nuts, corn, and various seeds, or even roots ; and in addition to this immediate injury, “the great damage,” says Pennant, “done to our fields by the Hogs rooting up the ground, is chiefly owing to their search after the concealed hoards of the Field Mice.” But when driven by hunger, they do not strictly confine themselves to this kind of food : they will eat various animal matters — young birds, or mice, or even each other, the smaller and weaker falling victims to the stronger.

It is very prolific ; breeding in many instances more than once in the year, and bringing from seven to ten young at a time. “Un homme de ma campagne,” says Buffon, “en prit un jour vingt-deux dans un seul trou : il y avoit deux mères et vingt petits.”

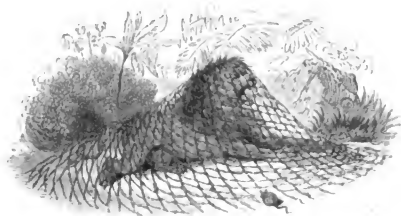
It is probably the same species as was known to the ancients under the name of *Mus agrestis major* ; whilst the *Mus agrestis minor* was the *Arvicola agrestis*. It is also certainly the *Mus domesticus medius* of Ray, as is clearly shown by the following quotation—“Caput longius quam in

mure domestico minore vulgari, oculorum orbitæ ut et oculi majores et prominentiores ; auriculæ latiores et rotundiores.”*

The Field Mouse is larger than the Common Field Vole, but varies considerably in size : the head is long and raised ; the muzzle tapering ; the whiskers very long ; the eyes remarkably large and prominent ; the ears large, oblong, oval, with the anterior margin turned in at the base, and a projecting lobe arising within the ear near the base of the posterior margin ; the tail nearly as long as the body, slender and tapering ; the legs long. The upper part and sides of the head, neck, and body, and the outer surface of the legs, of a yellowish colour, mingled with blackish, or of a yellowish brown, darker on the back ; each hair being grey or ash colour at the base, then yellow, and the tips of some of them black : under parts whitish, with a very slight greyish tint in some parts ; and a yellowish grey patch on the breast. Tail brown above, white beneath. Dimensions :—

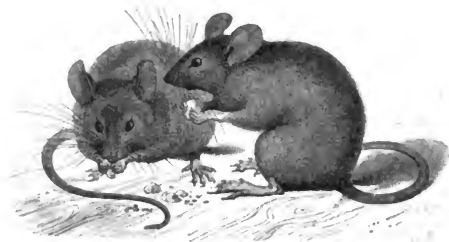
	Inch.	Lines.
Length of the head and body	3	8
„ of the head	1	1
„ of the ears	0	7
„ of the tail	3	6

* Raii Syn. Quad. p. 218.



RODENTIA.

MURIDÆ.



COMMON MOUSE.

Mus musculus. Linn.

Specific Character.—Fur brownish ash colour above, light ash colour beneath ; tail rather shorter than the body ; ears about half the length of the head.

- Mus musculus*, LINN. Syst. Nat. I. p. 83, sp. 13. PALL. Glir. p. 95.
 MULLER, Zool. Dan. Prod. p. 5, sp. 28. ERXL. Syst.
 p. 391, 5. DESMAR. Mammal. p. 301, sp. 478. FLEM.
 Brit. An. p. 19. JENYNS, Brit. Vert. p. 31.
 „ *domesticus vulgaris s. minor*, RAY, Syn. p. 218.
Souris, BUFFON, Hist. Nat. VII. p. 309, t. xxxix.
Common Mouse, PENN. Brit. Zool. I. p. 122, t. xi. SHAW, Gen. Zool. II.
 p. 56, t. cxxxi.

THERE are few animals more generally associated with mankind, or whose very existence appears to be more essentially dependent upon human arts and human civilisation, than this pretty, but annoying little pest. Domestic in its habits, nourished by almost every article of human food, and obtaining effectual shelter in the secret recesses of the habitations which human art has raised, it has accompanied man in all his adventures for colonisation, and identified itself with every new territorial occupation of our race. It

is not in our houses, however, that the devastations of the Mouse are most extensively felt. Multiplying in hosts, and safe from injury, they drill the whole interior of the wheat-rick, forming a labyrinth of its runs, and, in company with the Harvest Mouse and the Field Mouse, making incalculable havock amongst the grain. In the demolition of a single rick several bushels of Mice of various species have been destroyed, besides the numbers which must have escaped.

It is an elegant little animal, timid, but easily tamed. Its astonishing multiplication may be well imagined from the following experiment of the great father of natural history:—Having, says Aristotle, placed a pregnant female of the Common Mouse in a closed vessel filled with grain, I found after a short period no less than a hundred and twenty Mice, all sprung from that single parent. This astonishing increase is easily accounted for. The Mouse breeds indifferently at all seasons, and several times in the course of the year, producing ordinarily five or six young ones. In a fortnight the young are able to leave the mother, and assume an independent existence; and at a very early age they also reproduce.

In addition to the usual means employed for their extermination, such as traps of various kinds, and the carnivorous instinct of the Cat, the Ferret, and the Weasel, there still exists in Wales a custom so disgustingly cruel, that the very mention of it would be scarcely pardonable but for the possibility of thus producing some degree of shame in the perpetrators of it, and consequently saving some poor little Mice from being the victims of such barbarity. It is customary in some parts of Wales to roast a Mouse alive, hanging it before the fire by its tail tied to a string, that its screams may scare the rest from the house.

There are several varieties of the Common Mouse. One

of the most common, and which is perpetuated by breeding, is the *albino*, which is frequently kept as a pet. It becomes exceedingly tame, running about the table, and allowing itself to be taken in the hand without manifesting any alarm. Another variety, which is said to be common in India, is the *Pied Mouse*, the colours of which are brown and white. The *Rick Mouse*, or, as it is called in Scotland, the *Barn Mouse*, is larger and darker than the *House Mouse*; and I have a specimen of the ordinary size, which is nearly black above, and very dark grey beneath: it was taken in Hertfordshire.

The English word *Mouse*, the Anglo-Saxon *Mus*, the German *Maus*, the Danish *Muys*, the Latin *Mus*, are all evidently modified from the Greek *Mûs*, which is probably derived from *μύειν*, to hide. The Italian *Sorice*, and the French *Souris*, are as obviously from the Latin *Sorex*, now employed in our systematic catalogues to designate the genus of the *Shrews*.

The head of the *Mouse* is taper, the muzzle rather acute; the ears and the eyes smaller than in *M. sylvaticus*, the former rounded, but shorter and narrower than in that species; the whiskers also are shorter, the tail less slender and flexible, and the legs rather shorter. The fur is greyish brown above, grey beneath; ears, feet, and tail, clothed with a small quantity of fine soft and short hair.

Dimensions:—

	Inch.	Lines.
Length of the head and body	3	2
„ of the head	0	11
„ of the ears	0	5
„ of the tail	2	11

RODENTIA.

MURIDÆ.



BLACK RAT.

*Scoticè, RATTON.**Mus rattus.* Linn.

Specific Character.—Greyish black above, ash colour beneath ; ears half the length of the head ; tail a little longer than the body.

Mus rattus, LINN. Syst. Nat. I. p. 83, 12. MULL. Zool. Dan. Prod. p. 5, sp. 31. ERXLER. Syst. p. 382, 2. DESMAR. Mam. p. 300, sp. 476. FLEM. Brit. An. p. 20. JENYNS, Brit. Vert. p. 32.

„ *domesticus major,* RAY, Syn. Quad. p. 217.

Rat, BUFFON, Hist. Nat. VII. p. 238, t. xxxvi.

Black Rat, PENN. Brit. Zool. I. p. 113. SHAW, Gen. Zool. p. 32, t. cxxx.

THE old English or Black Rat, which is now becoming a rather rare animal in this country, was, previously to the introduction of its more powerful congener and persecutor, the Brown Rat, as numerous and as extensively distributed as that species has since become. It does not, however,

appear that even the former was known here before the middle of the sixteenth century ;—at least no author more ancient than that period has described or even alluded to it, Gesner being the first who described and figured it. Its smaller size renders it an unequal match for the Brown Rat, which, in the combats which famine occasions to take place between them, most usually comes off victorious ; and to this circumstance, rather than to any real antipathy between them, may probably be ascribed the gradual diminution in their numbers, and the usurpation by the Brown Rat of the former haunts of the present species, which is indeed now rarely found, excepting in old houses of large cities, as in London, in Edinburgh, and in some other places, where it still exists in considerable numbers, especially in the cellars and stables in the city of London, in many of which it is more common than the other. It is equally destructive of every kind of food, whether consisting of animal or vegetable matters ; and not satisfied with the ordinary articles of human food, falls upon every organised substance within its reach, devouring even woollen cloths, leather, and other articles of domestic use. It forms its runs between the walls of houses, and under the stone and brick flooring of cellars, coming forth in the night in search of food.

In warmer climates, where there is no winter to interrupt their breeding, or to cut off their supply of nourishment, the multiplication of this species, as well as of the Brown Rat, is enormous ; and they become in some seasons a most severe infliction upon the cultivators of the land.

Although its disposition appears to be naturally exceedingly ferocious, there are instances on record of its evincing considerable attachment, not only to each other, but to mankind. Mr. Jesse, in his usual amusing and pleasant style, gives us an anecdote, which the respectable authority from

which he derived it would forbid us to doubt, exhibiting a degree of tenderness and care towards the disabled and aged members of their community, which, were it imitated by Christian men, would either render our poor laws unnecessary, or remove the disgrace and opprobrium which their maladministration too often causes to attach to them. His informant, the Rev. Mr. Ferryman, walking out in some meadows one evening, "observed a great number of Rats in the act of migrating from one place to another, which it is known they are in the habit of doing occasionally. He stood perfectly still, and the whole assemblage passed close to him. His astonishment, however, was great, when he saw an old blind Rat, which held a piece of stick at one end in its mouth, while another Rat had hold of the other end of it, and thus conducted his blind companion." It appears also from several instances that this animal is not insensible of kindness, and that it may be powerfully attached to those who feed and caress it. Its motions are active and animated; it runs with great quickness, and leaps with agility and force. Like most of the genus, it can hold its food in the hands whilst eating, and it drinks by lapping. Its habits are cleanly; and its skin is ordinarily kept in beautiful order by the care with which it is cleaned,—an employment which occupies the greater part of its time, excepting when sleeping and eating. It breeds several times in the year, and the female brings ordinarily from seven to nine young. The nest is composed of grass, straw, and dried leaves, or of any other suitable material which they can obtain.

It is probable, from the proximity of the two countries, that it was introduced into this from France: indeed the Welsh name for it, which signifies 'French Mouse,' appears to favour this opinion. From Europe it has been sent with the Brown Rat to America, the islands of the Pacific, and

to many other places, in some of which it has now become a serious inconvenience.

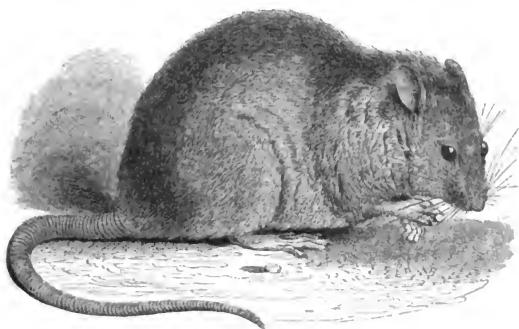
The larger species of this genus, which are usually denominated *Rats*, differ in some trifling particulars from the *Mice*, and have by some naturalists been considered as constituting a distinct genus, of which opinion is my friend Mr. Hogg, who proposes for the former the generic term *Rattus*: there does not, however, appear to me to be a sufficient ground for such a separation. The present species is smaller than the Brown Rat; the head is elongated; the muzzle taper and divided, and garnished with numerous long black hairs; the upper jaw projects far beyond the lower, which is remarkably short; the tongue is smooth; the nostrils open and crescent-shaped; the ears rounded, simple, naked, half as long as the head; the eyes large, not particularly prominent. The feet are decidedly plantigrade, with five toes on each; but the thumb on the anterior pair is concealed within the skin, excepting the terminal joint, with its claw. The soles of all the feet are tuberculated. The tail longer than the body, almost without hair, and covered with numerous rings of scales. Colour of the upper parts, greyish black; of the lower, dark ash colour: feet and tail dusky.

Dimensions:—

	Inch.	Lines.
Length of the head and body	7	4
„ of the head	1	10
„ of the ears	0	11
„ of the tail	7	11

RODENTIA.

MURIDÆ.



BROWN RAT.

NORWAY RAT.

Mus decumanus. Pall.

Specific Character.—Greyish brown above, whitish beneath ; ears one-third the length of the head ; tail shorter than the body.

- Mus decumanus*, PALLAS, Glir. p. 91. GMEL. Syst. Nat. Linn. I. p. 127.
 DESMAR. Mammal. p. 473, sp. 473. FLEM. Brit. An.
 p. 20. JENYNS, Brit. Vert. p. 32.
 „ *Norvegicus*, BRISSON, Reg. An. p. 173. ERXLEB. Syst. p. 381, 1.
Surmulot, BUFFON, Hist. Nat. VIII. p. 206, t. xxvii. FR. CUVIER,
 Mammal. I.
Norway Rat, PENN. Brit. Zool. I. p. 115. SHAW, Gen. Zool. II. p. 51,
 t. cxxx.

THE geographical distribution of animals, although a subject of great interest, is scarcely confined within such restrictions as to offer any very well defined laws, either with reference on the one hand to organisation and habits, or, on the other, to zoological classification. There are, it is true,

certain groups which are strictly confined within the boundaries of a particular tract of country ; there are some, the habitations of which are evidently regulated by climate, by soil, or by the necessity of a particular kind of food, whilst others appear to be located with very little regard to any obvious object ; some individual species again are found but in one small corner of the globe, where they exist perhaps in inconsiderable numbers ; whilst others, capable of procuring their nourishment from the products of every region, and readily transplanted by means of the commercial intercourse of various nations, become naturalised in every new colony to which they have been accidentally transported, and at length identified with the original natives of their adopted country. Of those which fall within the scope of the latter observation, there are none to which it applies with more force than to the common Brown Rat, which is now so generally distributed wherever man has planted his foot, that its original country can no longer be ascertained, although there is reason to believe that it comes from a warmer climate than our own. It was doubtless brought hither by means of merchant-vessels from some southern or south-eastern country ;—Pennant imagines from the East Indies. It certainly was known in Asia long before we have any account of its existence in any part of Europe ; and its transit from the Asiatic borders into European Russia was well ascertained. In Paris it made its appearance about the middle of the eighteenth century, and in England not very many years earlier. It is by a strange mistake called by many the Norway Rat, as if it were aboriginal in that country ; whereas in fact, at the time when the name was first applied to it, it was not known even to exist there. Its astonishing fecundity, its omnivorous habits, the secrecy of its retreats, and the ingenious devices to which it has recourse, either to retain its

existing place of abode, or to migrate to a more favourable situation, all conduce to keep up its almost overwhelming numbers. It digs with great facility and vigour, making its way with rapidity beneath the floors of our houses, between the stones and bricks of walls, and often excavating the foundations of a dwelling to a dangerous extent. There are many instances of their fatally undermining the most solid mason-work, or burrowing through dams which had for ages served to confine the waters of rivers and canals. The most remarkable instance, however, which I have met with of the extent of their subterranean ravages, their multitudinous numbers, and their almost incredible consumption of food, is contained in the following narration.

It is not very long since an official report was made to the French Government, with reference to a "proposition made for the removal of the Horse slaughter-house at Monfaucon to a greater distance from Paris ; when one of the chief obstacles urged against such a removal, was the fear entertained of the dangerous consequences that might result to the neighbourhood from suddenly depriving these voracious vermin of their accustomed sustenance. The report goes on to state that the carcasses of the Horses killed in the course of a day (and sometimes these amounted to thirty-five) are found the next morning picked bare to the bone. Dusaussais has, however, made a still more conclusive experiment. A part of his establishment is enclosed by solid walls, at the foot of which are several holes made for the ingress and egress of the Rats. Into this enclosure he put the carcasses of two or three Horses ; and, towards the middle of the night, having first cautiously, and with as little noise as possible, stopped up all the holes, he got together several of his workmen, each having a torch in one hand, and a stick in the other. Having entered the yard and closed the door behind them, they

commenced a general massacre. It was not necessary to take any aim, for no matter how the blow was directed, it was sure to immolate a Rat; and those which endeavoured to escape by climbing up the walls were quickly knocked down. By a recurrence of this experiment at intervals of a few days, he killed in the space of a month 16,050 Rats. After one night's massacre the dead amounted to 2,650; and the result of four hunts was 9,101. Even this can give but an imperfect idea of the number of these vermin; for the enclosure in which they were thus killed contains not above the twentieth part of the space over which the dead bodies of Horses are spread, and which, it is but fair to suppose, must equally attract the Rats upon all points. These animals have made burrows for themselves, like Rabbits, in the adjoining fields, and hollowed out into catacombs all the surrounding eminences—and that to such an extent, that it is not unusual to see the latter crumble away at the base, and leave these subterraneous works exposed. So great is the number of these animals, that they have not all been able to lodge themselves in the immediate vicinity of the slaughter-houses; for paths may be distinctly traced leading across the fields from the enclosures in which the Horses are killed, to a burrow about five hundred paces distant.”*

When they determine to leave a particular building, to which they are generally instigated either by the cessation of a sufficient supply of food, or, as it is proverbially stated, when any ruinous injury is found to exist in its masonry, they emigrate in a body, and by night; and woe to the devoted structure to which they attach themselves! They speedily commence their excavations, and in a short time become so completely established, that nothing short of famine can again dispossess them. They are bold and ferocious

* See Jesse's Gleanings, Second Series, p. 311.

when attacked, or when confined in a room with either a human being or a Dog ; flying with the most reckless fury at the object of their fear or anger. If several be enclosed in a box together, they fight furiously, and the weaker is not only killed, but devoured by the stronger. The Rat swims with great ease. The gardens of the Zoological Society of London, in the Regent's Park, are greatly infested by them ; but as they are too cunning to risk the danger of being caught during the day-time, or alarmed, perhaps, at the concourse of persons by whom the gardens are frequented, they are often seen towards evening crossing the canal in a boat from the opposite shore, in order to land in the gardens, and enjoy their night's depredations, returning in the morning in the same manner to their daily retreat.

The habits of the Brown Rat are thus generally similar to those of the Black Rat. They are even more prolific ; breeding several times in the year, and producing as many as ten, twelve, or fourteen at a birth. It would be easy to multiply facts and anecdotes of this curious animal ; but enough has been said to exhibit it as a sagacious, bold, and annoying plague, whose extirpation is provided against by these qualities, as well as by its astonishing fecundity.

The best mode of destroying the Rat is by means of the traps first employed by Mr. Board, whose plan is detailed in a little work written for the purpose. This plan has been adopted in the Zoological Gardens with great success.

They feed on every article of household consumption ; and they also make great havock in the fields with corn, beans, and other grain and pulse, of which, after eating their fill, they carry off a large quantity, and deposit it in their runs. They are also sad depredators on the poultry-yard and game-preserves, devouring numbers of eggs and young both of domestic poultry and of partridges.

The Brown Rat considerably resembles the old English or Black Rat : it is, however, somewhat larger ; the head is less elongated ; the muzzle less acute ; the ears smaller ; the tail comparatively much shorter. The ears and muzzle are nearly naked ; the tail with about one hundred and eighty scaly rings, each scale having a small hair or two growing from beneath it. Colour of the upper parts greyish brown with a tawny tint, resulting from each hair being dusky grey at the roots, and yellowish brown at the extremity ; a few stiffer blackish hairs are also scattered amongst the others : the under parts are a dirty white. Dimensions :—

					Inch.	Lines.
Length of the head and body	.	.	.	.	10	8
„ of the head	.	.	.	.	2	4
„ of the ears	.	.	.	.	0	8
„ of the tail	.	.	.	.	8	2



Genus *Arvicola*. Lacép.

VOLE.

Generic Character.—Grinding-teeth $\frac{3}{3}$, deeply sulcated externally; muzzle obtuse; toes separate; tail round and hairy, shorter than the body.

WATER VOLE.

WATER RAT.

Arvicola amphibius. Desmar.

Specific Character.—Fur above dusky grey, with a reddish or yellowish tinge; paler beneath: tail more than half the length of the body.

- | | |
|--------------------------------------|---|
| <i>Castor caudâ lineari tereti</i> , | LINN. Faun. Suec. I. p. 10. |
| <i>Mus amphibius</i> , | LINN. Syst. Nat. I. p. 82. MULL. Zool. Dan. |
| | Prod. p. 5, sp. 30. ERXLEN. Syst. p. 86, 3. |
| „ <i>aquaticus</i> , | BRISSON, Reg. Anim. p. 175. |
| <i>Lemmus aquaticus</i> , | FR. CUVIER, Dict. des Sc. Nat. VI. p. 306. |
| <i>Arvicola amphibius</i> , | DESMAR. Mammal. p. 280, sp. 435. |
| „ <i>amphibia</i> , | JENYNS, Brit. Vert. p. 33. |
| „ <i>aquatica</i> , | FLEM. Brit. An. p. 23. |
| <i>Rat d'eau</i> , | BUFFON, Hist. Nat. VII. p. 368, t. xliii. |
| <i>Water Rat</i> , | PENN. Brit. Zool. I. p. 118. SHAW, Gen. Zool. |
| | II. p. 73, t. cxxix. |
| ? | Var. β , deep black above and beneath. (Possibly a distinct species.) |
| <i>Arvicola ater</i> , | MACGILLIVRAY, Trans. Wern. Soc. VI. p. 424. |

THE location of the *Arvicolæ* with the genus *Mus*, involves an inconsistency which was early detected, and the

correction of which has been universally recognised and followed. The characters of the teeth, as well as the general form of the body, and the habits of all the species, remove them not only generically from the *Mures*, but even point out their association with a different family of the Rodentia, and their affinity to the Beaver appears to have forcibly struck Linnæus himself; who, in his *Fauna Suecica*, applied the name *Castor* to the present species. The generic term *Arvicola*, if not absolutely unobjectionable, must be retained, as having the sanction of priority over the name *Microtus* of Schrank, *Hypudæus* of Brant, or *Lemmus* of Fr. Cuvier. With regard to the name of the family, I have ventured to change that of Mr. Gray, *Arvicolidæ*, to *Castoridæ*, because the genus *Castor* must be considered as the type of the family, of which the present can only be an aberrant form.

The Water Vole, or, as it is more frequently called, the Water Rat, is found in most parts of Europe. In this country it is very common; frequenting the banks of rivers, excavating its habitations to a considerable distance, and breeding in these subterranean caverns. It dives and swims with great facility, instantly seeking the water upon every alarm, and plunging at once to the bottom; from whence, however, it is obliged to return to the surface for respiration about every minute. It has often been asserted that the Water Vole lives upon small fish, earthworms, and insects, and it has even been accused of destroying young ducks. There is not, however, the slightest foundation for this opinion. Its food consists exclusively of vegetables, and principally of roots, or of subaquatic plants; and there can be no doubt that the belief of its carnivorous habits has arisen from its being confounded with the common Brown Rat, *Mus decumanus*, which is well known to frequent the banks of ditches, and to feed readily on almost

all animal substances, attacking even the smaller animals alive, when driven by hunger: and it is, in fact, in the organisation essentially connected with these different habits and propensities, that the characters of the two families consist.

The female produces five or six young in the month of May or June; sometimes as early as April, in which case it is probable that they have another brood in the course of the summer.

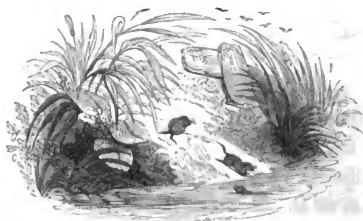
The head of this animal is thick, short, and blunt; the eyes small, and not very prominent; the ears short, scarcely conspicuous beyond the fur; the cutting teeth of a deep yellow colour in front, very strong, chisel-shaped, considerably resembling those of the Beaver; the surface of the grinding-teeth formed of alternate triangles arranged on each side of the longitudinal axis: fore-feet with four complete toes, the last phalanx only of the thumb being conspicuous beyond the skin; hinder feet with five toes, not webbed, though connected to a short distance from the base; tail more than half the length of the body, covered with hairs, of which those on the inferior surface are rather long, and probably assist the animal in swimming by forming a sort of rudder of the tail. Fur thick and shining; of a rich reddish brown mixed with grey above, yellowish grey beneath.

Dimensions:—

	Inch.	Lines.
Length of the head and body	8	4
„ of the head	1	10
„ of the ears	0	5
„ of the tail	4	8

A black variety of this species has long been known, and has been described by Pallas, and by several other Continental zoologists. It is probably identical with the animal described by Mr. Macgillivray in the sixth volume of the Transactions of the Wernerian Society of Edinburgh, under

the name of *Arvicola ater*. According to that gentleman's account, it is exceedingly common in the counties of Banff and Aberdeen; and it is said that the common Water Vole is not found where this one abounds. Its habits are similar to those of the former; but Mr. Macgillivray believes that there exist sufficient differences in the organisation and colour of the two to constitute them distinct species. It is of a deep black colour above, and black with a greyish tinge beneath. It is smaller than the brown one; but the proportions are not conspicuously, if at all different. This author believes the number of caudal vertebræ to be different; and were this constantly the case, it would go far to establish their specific distinction: but an examination of a stuffed specimen belonging to my friend Mr. Yarrell does not, on a comparison with several of the common sort, appear to me to justify this supposition. Mr. Jenyns states that "the black variety is not uncommon in the fens of Cambridgeshire, and differs in no respect from the other but in colour;"—a testimony which must weigh very heavily against the opinion of its being specifically distinct, when we consider the great accuracy of that gentleman's observation.



RODENTIA.

CASTORIDÆ.



FIELD VOLE.

SHORT-TAILED FIELD MOUSE. MEADOW MOUSE.

Arvicola agrestis. Flem.

Specific Character.—Fur reddish brown above, grey beneath; tail one-third the length of the body.

- Mus agrestis brachyuros*, RAY, Syn. p. 218.
 „ *agrestis*, LINN. Faun. Suec. II. p. 11.
 „ *arvalis*, PALLAS, Glir. p. 79, 14. GMEL. in Linn. Syst. Nat. I. p. 134.
Lemmus arvalis, FR. CUVIER, Dict. des Sc. Nat. VI. p. 304.
Arvicola vulgaris, DESMAR. Mammal. p. 282, sp. 439.
 „ *agrestis*, FLEM. Brit. An. p. 23. JENYNS, Brit. Vert. p. 33.
 YARRELL, Proc. Zool. Soc. pt. II. p. 109.
 „ *arvalis*, SELYS-LONGCHAMPS, Camp. de Liège, p. 8.
Campagnol, BUFFON, Hist. Nat. VII. p. 369, t. xlvii.
Short-tailed Field Mouse, PENNANT, Brit. Zool. I. p. 123.
Meadow Mouse, SHAW, Gen. Zool. II. p. 81, t. cxxxvi.

OF all the smaller Rodentia which, by their depredations in the fields or the woods, may be considered as injurious to

mankind, there is not one which produces such extensive destruction as this little animal, when its increase, as is sometimes the case, becomes multitudinous. The nature of its food, which, like that of the rest of the genus, is exclusively of a vegetable kind, prevents it from becoming domesticated amongst us, and drives it to the wood, the corn-field, the rick-yard, and the granary ; in each of which, but especially in the former two, its ravages are sometimes excessively extensive. Whilst the Field Mouse confines itself principally to drier situations, the present species frequents meadows and damp pastures, but by no means restricting itself to such localities. After having followed the labours of the reaper, and taken their share of the harvest, they attack the newly-sown fields, burrowing beneath the surface, and robbing the husbandman of his next year's crop ; and at length, retreating to the woods and plantations, commit such devastations on the young trees as would scarcely be credible, were not the evidence too certain to be doubted. In the years 1813 and 1814, these ravages were so great in the New Forest and the Forest of Dean, as to create considerable alarm lest the whole of the young trees in those extensive woods should be destroyed by them. A letter from Lord Glenbervie to Sir Joseph Banks, published afterwards in the first volume of the Zoological Journal, gives a very detailed and interesting account of these injuries, and of the methods employed for the destruction of the Mice, of which by far the greater number proved to be of the present species, though there were also taken a considerable number of *Mus sylvaticus*. Mr. Jesse has given an abstract of these details, with the addition of some other facts, and I extract the following account from the first series of that gentleman's interesting "Gleanings."

"An extraordinary instance of the rapid increase of Mice,

and of the injury they sometimes do, occurred a few years ago in the new plantations made by order of the Crown in Dean Forest, Gloucestershire, and in the New Forest, Hampshire. Soon after the formation of these plantations, a sudden and rapid increase of Mice took place in them, which threatened destruction to the whole of the young plants. Vast numbers of these were killed; the Mice having eaten through the roots of five-year old oaks and chestnuts, generally just below the surface of the ground. Hollies also, which were five or six feet high, were barked round the bottom; and in some instances the Mice had crawled up the tree, and were seen feeding on the bark of the upper branches. In the reports made to Government on the subject, it appeared that the roots had been eaten through wherever they obstructed the runs of the Mice.

“ Various plans were devised for their destruction; traps were set, poison laid, and cats turned out; but nothing appeared to lessen their number. It was at last suggested that if holes were dug, into which the Mice might be enticed or fall, their destruction might be effected. Holes, therefore, were made, about twenty yards asunder, in some of the Dean Forest plantations, being about twelve in each acre of ground. These holes were from eighteen to twenty inches in depth, and two feet one way by one and a half the other; and they were much wider at the bottom than at the top, being excavated or hollowed under; so that the animal, when once in, could not easily get out again. In these holes at least thirty thousand Mice were caught in the course of three or four months, that number having been counted out and paid for by the proper officers of the forest. It was, however, calculated that a much greater number than these were taken out of the holes, after being caught, by stoats, weasels, kites, hawks, and owls; and also by crows, magpies, jays,

&c.* The cats, also, which had been turned out, resorted to these to feed upon the Mice; and, in one instance, a dog was seen greedily eating them. In addition to the quantity above mentioned, a great many Mice were destroyed in traps, by poison, and by animals and birds of prey; so that in Dean Forest alone, the number of those which were killed in various ways could not be calculated at much less than one hundred thousand. In the New Forest, from the weekly reports of the deputy-surveyor of the forest, about the same number were destroyed, allowing the same calculation for those eaten by vermin, &c.; in addition to which, it should be mentioned that these Mice were found to eat each other when their food fell short in winter. Putting these circumstances together, the total destruction of Mice in the two forests in question would probably amount to more than two hundred thousand."

This detail is not only interesting as it refers to the destructive habits of the species, and the best means of extirpating them, but also as affording a striking illustration of the fondness for roots which probably characterises most of the genus, and which led my friend Mr. Hogg to suggest as a generic name, the word *Rhizomys*. It is extremely fond of carrots, and often attacks them, eating far into the substance of the root, leaving the outer layer apparently but little injured. It does not, however, as I have already observed, restrict itself to such food. It devours large quantities of grain, and other vegetable substances; and if several of them be confined in a box together, if they be not plentifully supplied, they fight desperately, and the weaker becomes the food of the stronger. This, however, does not occur excepting when caused by famine.

* A somewhat similar plan has been successfully employed by the farmers in the neighbourhood of Liege; but the holes are round, not more than four inches in diameter, and a foot in depth: they appear fully to answer the purpose.

The Field Vole either burrows itself, or takes possession of the excavations of other animals, particularly of the Mole. It also frequently takes up its winter residence in wheat-ricks or barns. In dry seasons numbers of them perish ;— a circumstance which accords with their fondness for damp situations. The female forms her nest of dried grass, and brings five, six, or seven young at a time.

The head is large ; the muzzle very obtuse ; the ears just appearing above the fur : the body thick and full ; the tail not more than one-third the length of the body, sparingly covered with hair ; thumb of the fore-feet rudimentary, without a claw. Colour of the upper parts reddish brown, mixed with grey ; of the under parts, ash colour : feet and tail dusky.

Dimensions :—

	Inch.	Lines.
Length of the head and body	4	1
„ of the head	1	2
„ of the ears	5	0
„ of the tail	1	3½



RODENTIA.

CASTORIDÆ.



BANK VOLE.

Arvicola pratensis. Baillon.

Specific Character.—Fur bright chestnut red above, grey beneath; ears slightly conspicuous; tail half as long as the body.

Arvicola pratensis, BAILLON in FR. CUV. Mammif. Lith. IV.

„ *riparia*, YARRELL in Proceed. of Zool. Soc. 1832, p. 109.—Id.
Loud. Mag. Nat. Hist. V. p. 598. JENYNS, Brit. Vert.
p. 34.

„ *rufescens*, SELYS-LONGCHAMPS, Campag. de Liège, p. 13, sp. 3, t. iv.

AFTER a careful examination of the species described by Mr. Yarrell in the Proceedings of the Zoological Society for 1832, under the name of *Arvicola riparia*, and a comparison of its characters with those of *A. pratensis* of M. Baillon, figured in the fourth volume of M. F. Cuvier's great work on the Mammifera, as well as with the description and figure of *A. rufescens* of M. Selys-Longchamps, contained in his *Essai Monographique sur les Campagnols des environs de Liège*, I have come to the conclusion that they all appertain

to one species. Even were this not the case, still the name of *riparia* could not have been retained, as it had already been given by Mr. Ord* to an American species, though it was afterwards changed by Dr. Harlan, in his *Fauna Americana*, without any apparent reason. It appears certain that the *A. pratensis* of Baillon is the present species, as its proportions, colour, and habits are similar, and in both cases distinct from those of *A. agrestis*. With regard to the second synonym, as the work of M. Selys-Longchamps is but little known in this country, I quote his description of *A. rufescens* at length, that my readers may judge for themselves as to its identity with the present species. This author believes it to be the same as the *Mus rutilus* var. *Germania* of Gmelin.

“CAMPAGNOL ROUSSATRE. *Arvicola rufescens*.

“Je décris cette espèce à regret, parceque je ne la connais pas encore suffisamment pour compléter son histoire et lever toutes les doutes qui peuvent s'élever à son égard, n'en possédant que deux individus qui, à la vérité, offrent des caractères assez frappans.

“Par exemple, la queue est aussi longue que la moitié du corps ; bicolore, noirâtre en-dessus, blanche en-dessous, ce qui les sépare de *l'arvalis*. Les yeux sont proéminens ; les oreilles assez longues, ce qui les distingue du *subterraneus*. Les pieds sont blanchâtres. Les doigts sont proportionnellement plus allongés, et le pouce rudimentaire des antérieurs plus visible que dans *l'arvalis*. Le dessus du corps est d'un doux ferrugineux assez vif (couleur tabac d'Espagne) sur le dos, et d'un gris cendré sur les côtés. Le dessous du corps est blanchâtre. Dans bien des individus, la couleur roux foncé domine sur tout le dessus du corps, et

* Journ. Acad. Sc. Philad. 1V. p. 305. See also Dr. Richardson's *Fauna Boreali-Americana*, I. p. 120.

la poitrine est nuancée de jaunâtre. Dans l'autre, le roux ne se mêle au gris que sur le dos, sans pour cela être d'une nuance différente."

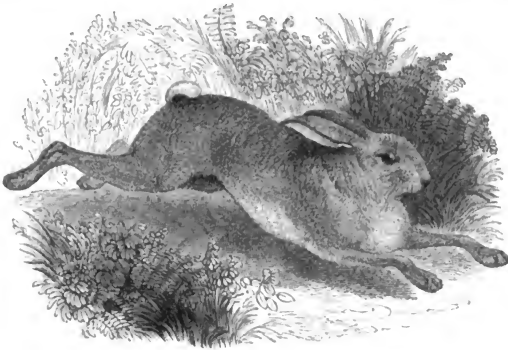
This agrees remarkably with Mr. Yarrell's description, as well as with that of Mr. Jenyns in his *British Vertebrata*. I refer particularly to the smaller size of the animal; the greater proportional length of the tail, of the feet, and of the ears; and the colour, not only of the body, but of the tail;—in all of which particulars the description agrees with that of Mr. Yarrell's species. It must, however, be observed that this author states the number of caudal vertebræ to be the same in this species as *A. agrestis*; but as he gives the number of the latter incorrectly, we cannot probably depend upon this character.

The Bank Vole was first discovered by Mr. Yarrell at Birchanger in Essex; he afterwards received it from Hertfordshire, Middlesex, and Berkshire; and Mr. Jenyns has added Cambridgeshire. I have also received it from Hertfordshire.

It differs from the common species in the external characters already mentioned, and in many important particulars in its internal anatomy, for which I beg to refer to the details given by Mr. Yarrell in the works above mentioned.

Dimensions :—

	Inch.	Lines.
Length of the head and body	3	4
„ of the head	1	0½
„ of the ears	0	5
„ of the tail	1	8

Genus, *Lepus*.

HARE, RABBIT.

Generic Character.—Grinding-teeth $\frac{3}{3}$, with flat summits, the plates of enamel transverse; cutting teeth grooved, four in the upper jaw, two in front, and two smaller immediately behind them; ears very long; tail short and turned up.

COMMON HARE.

Scotticè, MAUKIN.*Lepus timidus*. Linn.

Specific Character.—Fur above and on the sides tawny grey, mixed with brown; the belly white: tail nearly as long as the head, black above, white beneath; ears longer than the head, black at the tips.

<i>Lepus</i> ,	RAY, Syn. Quad. p. 204.
„ <i>timidus</i> ,	LINN. Syst. Nat. ed. xii. I. p. 77. MULLER, Prod. Zool. Dan. p. 4, sp. 23. ERXLEB. Syst. p. 325, sp. 1. DES- MAR. Mammal. p. 347, sp. 559. FR. CUVIER, Mammif. FLEM. Brit. An. p. 21. JENYNS, Brit. Vert. p. 34.
„ <i>vulgaris</i> ,	LINN. Syst. Nat. ed. ii. p. 45.
„ <i>Europæus</i> ,	PALL. Glir. p. 30.
<i>Lièvre</i> ,	BUFFON, Hist. Nat. VI. p. 246, t. xxxviii.
<i>Hare</i> ,	PENN. Brit. Zool. I. p. 98. SHAW, Gen. Zool. II. p. 197, t. clii.

THE genus to which this animal belongs is one of the most natural in the whole of the Rodentia. It is charac-

terised by numerous striking and well-marked peculiarities. The incisive teeth are numerically different from those of all the rest of the order. In addition to the two long curved chisel-shaped teeth in each jaw, there are added in the upper two smaller ones, placed immediately behind the normal pair. The whole of the incisive teeth are flat, and grooved on the anterior surface; those of the lower jaw somewhat wedge-shaped. The grinding-teeth are formed for the mastication of vegetable substances only, being constantly worn down, and as constantly in a state of increase from beneath, as in the *Castoridae* and *Hystricidae*, families which include the Beaver and the Porcupine. The worn surfaces are uneven, and the projecting laminæ of the enamel transverse. The ears in all the species are long; the eyes large, prominent, and placed laterally; the hinder legs, especially in the true Hares, much longer than the fore-legs; the feet hairy; and the tail short and turned up. The teats are both pectoral and inguinal. The prevailing colour is a mixture of grey and reddish brown; in some the principal colour is fulvous, in others the grey predominates. The admirable wisdom which assigns such colours as these to a group of animals which conceal themselves in the brown sombre vegetation of heaths and woods, will appear still more striking when it is recollected that certain species, inhabiting the snowy regions of the North, become wholly white in the winter. They are all of them remarkable for their timidity; and their whole structure is such as at once to announce to them the approach of danger, and to enable them to escape from it; for the eyes and ears are so formed and so situated as to become instantly cognisant of even distant sights and sounds of peril, and the limbs are as perfectly adapted for the most rapid flight.

With all these similarities, however, there are great diversities in the habits of the different species. Whilst the Rabbit excavates its burrows to a considerable depth, and instantly betakes itself to them on the approach of danger, the Hare makes but a superficial depression, called the form, which it uses as a resting-place, but which from its exposed situation can be of no use as a retreat, and trusts for its safety to the rapidity and duration of its course.

The food of the whole genus, and indeed of the whole family, consists exclusively of vegetables. For this their teeth are peculiarly constructed; and the structure of the stomach and intestinal canal is no less obviously designed for the digestion of such substances alone.

The Common Hare may perhaps be considered as possessing all the characters of the genus in a typical degree. Its ears are longer, its eyes larger and more prominent, its hinder legs more inordinately lengthened, than in any other species; and its habits exhibit, in a corresponding degree of excess, all the peculiarities dependant upon such an organisation. Its hearing and sight are most acute; its timidity, if possible, greater, and its course swifter, than in any other. These qualities, combined with its excellence as an article of food, have rendered this poor harmless animal in all ages a favourite object of the chase; and the various doublings, and other ingenious devices, to which it resorts for the purpose of baffling its pursuers, give to Hare-hunting an interest and zest of which the timidity and innocence of the object would otherwise have deprived it. But, after all,

“Poor is the triumph o’er the timid Hare;”

and whatever excuses may be found for the pursuit of the Fox on the score of necessity, as ridding the country of a noxious animal,—an excuse, however, which can scarcely be made by those who forbid its destruction by any other means

as an unpardonable offence against the sportsman's arbitrary code,—no such excuse can be made for this sport ; whilst, on the other hand, the degree of danger and difficulty is scarcely sufficient to invest it with enough of excitement to conceal its character of cowardice and cruelty. It is true that coursing is in a degree less cruel, as the poor trembler's agony is comparatively short-lived ; but it appears to me that mercy and humanity can scarcely consist with the ardent love of either variety of a sport, the whole interest of which depends upon the intense exertion to which a helpless and defenceless creature can be driven by the agonies of fear and desperation.

It was, however, very early an object of the chase. Xenophon, in his *Cynegeticus*, enters with considerable minuteness, and no little zeal, into the detail of the sport, and gives some very curious and accurate facts on the habits of the Hare. This is the earliest mention of the chase of this animal ; but it is introduced into most of the subsequent treatises on hunting of every period.

In our own country it has always been a more general sport than either Stag or Fox hunting, because easily followed, with less expense and more certainty. But as the details of field-sports can scarcely be considered as amongst the legitimate subjects of a work like the present, I beg to refer for more particular information to Daniel's *Rural Sports*, or any of the numerous treatises upon hunting.

The Hare is as exclusively a vegetable feeder as perhaps any known mammiferous animal. The structure of the teeth has been already alluded to, and that of the whole of the digestive organs is not less adapted for such habits. Its food consists of various kinds of herbage ; and it becomes at times a very annoying and destructive invader, not only of the field and garden, but of young plantations, gnawing off the bark, and thus destroying great numbers of young

trees. They also occasion great injury to the fields of young wheat and other grain; they are fond of aromatic herbs, such as thyme, parsley, &c.

The Hare having made its form, remains on it during the day, leaving it only at night to seek its food, and constantly returning after the most extensive travels: hence it is said proverbially that the wounded Hare returns home to die. It attaches itself closely to this place of rest, and is with difficulty driven from it. It changes its situation, however, according to the season; selecting a shady place in the summer, and in the winter an aspect in which it may receive the whole influence of the sun's rays. It swims well, and takes the water readily,—not for the purpose of escaping from pursuit merely, but for the sake of obtaining a plentiful supply of food; and the male will often swim across a river in search of the female. Amidst numerous anecdotes of this habit which I have heard and read, the following appears to me to be the most interesting. It is related by my friend Mr. Yarrell, in the fifth volume of Loudon's Magazine.

“A harbour of great extent on our southern coast, has an island near the middle of considerable size, the nearest point of which is a mile distant from the main land at high water, and with which point there is frequent communication by a ferry. Early one morning in spring, two Hares were observed to come down from the hills of the main land towards the sea-side; one of which, from time to time, left its companion, and proceeding to the very edge of the water, stopped there a minute or two, and then returned to its mate. The tide was rising; and, after waiting some time, one of them, exactly at high water, took to the sea, and swam rapidly over, in a straight line, to the opposite projecting point of land. The observer on this occasion, who was near the spot, but remained unperceived by the Hares,

had no doubt they were of different sexes, and that it was the male that swam across the water, as he had probably done many times before. It was remarkable that the Hares remained on the shore near half an hour; one of them occasionally examining, as it would seem, the state of the current, and ultimately taking to the sea at that precise period of the tide called slack-water, when the passage across could be effected without being carried by the force of the stream either above or below the desired point of landing. The other Hare then cantered back to the hills.

The Hare breeds when a year old; and the female, after thirty days' gestation, brings from two to five young, which are born covered with hair, and with the eyes open. As soon as the period of lactation is over, which lasts less than a month, the leveret leaves the mother, and seeks its own subsistence. The teats are ten in number. The long-mooted question of the possibility of superfetation has been supposed by some to be decided in the affirmative by circumstances which have for ages been known to take place in this animal. Pliny distinctly declares that the Hare and the Rabbit are the only animals in which it does occur.* Sir Thomas Brown, in his learned and entertaining book on "Vulgar Errors," devotes a chapter to the Hare, in which he alludes to the same fact; and M. Frederic Cuvier also states it. The solution of the difficulty will at once strike every one who is acquainted with the anatomy of this group of animals.

The Hare has been the subject of numerous superstitions. Of the various medicinal qualities of its flesh Pliny makes frequent mention in the twenty-eighth chapter

* *Lepus omnium prædæ nascens, solus præter dasypoden superfœtat, aliud educans, aliud in utero pilis vestitum, aliud implume, aliud inchoatum gerens pariter.*—Plin. Hist. Nat. lib. VIII. cap. lv.

of his *Historia Naturalis*, on animal remedies ; and it was, in ancient times, the subject of frequent omens. It appears to have been a well-known animal from remote antiquity. It was the *Λαγώς* of the Greeks, and the *Lepus* of the Romans ; and from the latter name are clearly derived the Italian *Lepre* and *Lievora*, the Spanish *Liebre* and *Lebratillo*, the Portuguese *Lebrimho*, and the French *Lièvre*. Our own name *Hare*, the German *Hase*, the Danish *Haas*, *Haze*, and the Swedish *Hara*, are all from one root : the Anglo-Saxon was *Hara*. But the derivation of all these names appears to be doubtful. It has been supposed by some to be derived from the Anglo-Saxon *Hær*, 'hair,' from its hairy coat ; others have suggested that it is from *hergian*, 'to harry.' The former appears the more probable etymology.

In addition to the account which has already been given of the general characters of the genus, the head of this species is thick ; the inside of the cheeks hairy ; the nostrils circular, and connected, by a fold, with the upper lip, which is cleft. The eyes are large and prominent, and the pupil horizontally elongated. The ears are about an inch longer than the head, approximate at their base ; the limbs slender ; the fore legs are much shorter than the hinder, and have five toes, furnished with strong, thick claws ; the hinder legs have but four toes, the thumb being wanting ; the soles of both pairs of feet completely covered with hair. Tail short, recurved. The general colour of the upper parts of the body is a yellowish brown mingled with grey, and of the lower parts white, excepting beneath the neck and anterior part of the chest, which are yellowish, which colour also predominates between the ears, on the neck, the shoulders, and sides of the body : the ears are of a yellowish grey on the anterior part of the outer surface, whitish behind, and terminating in a black tip

The internal surface is nearly naked, excepting at the outer margin, which is furnished with blackish grey hairs. The tail is black above, and white beneath.

The Hare is said to become white in winter in cold climates. In Lapland it acquires the brown clothing only during the summer months. Whether this peculiarity belongs exclusively to the *Lepus variabilis*, or is also possessed by the present species, I have not ascertained.

The general weight of the Hare is about eight or nine pounds; now and then individuals are taken of twelve pounds; and an instance is recorded in Loudon's Magazine, of a female Hare which weighed no less than thirteen pounds, one ounce and a half.

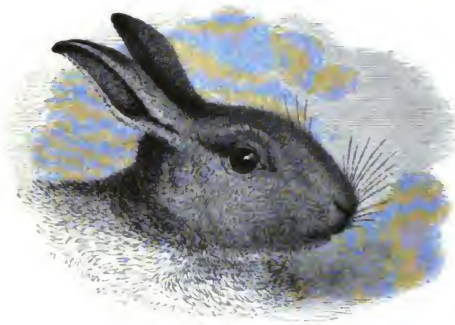
Dimensions :—

	Feet.	In.	Lines.
Length of the head and body	1	9	8
„ of the head	0	3	10
„ of the ears	0	4	10
„ of the tail	0	3	8



RODENTIA.

LEPORIDÆ.



IRISH HARE.

Lepus Hibernicus.

Specific Character.—Fur above uniform rufous brown; ears shorter than the head.

Irish Hare, YARRELL in Proceed. Zool. Soc. 1833, p. 88.

Lepus timidus, var. β . JENYNS, Brit. Vert. p. 35.

IN the year 1833, the Earl of Derby, then Lord Stanley, and President of the Linnean Society, sent to that society a specimen of the Hare of Ireland, which his lordship had obtained at Liverpool. It was described by Mr. Yarrell at that time, and subsequently at a meeting of the Zoological Society in the same year. A careful examination of several specimens has assured me that it is not merely a variety of the Common Hare of England, but that it is specifically distinct. The characters in which it principally differs from

the latter are as follows :—It is somewhat larger ; the head is rather shorter ; the ears are even shorter than the head, while those of the English Hare are fully an inch longer ; the limbs are proportionally rather shorter ; and the hinder legs do not so much exceed the fore legs in length. The character of the fur is also remarkably different : it is composed exclusively of the uniform soft and shorter hair which in the English species is mixed with the black-tipped long hairs, which give the peculiar mottled appearance of that animal ; it is therefore of a uniform reddish brown colour on the back and sides. The ears are reddish grey, blackish at the tip, with a dark line near the outer margin. The tail is of nearly the same relative length as in the common species. The numerous discrepancies in the colour and texture of the fur, and in the form and proportion of the different parts of the animal, appear to me to be too important to constitute merely the characters of a variety.

It cannot be confounded with the Alpine Hare, although the relative length of the ears is nearly the same ; the size and form of the body, the tail, and the texture and colour of the fur, being strikingly different.

It is certainly a very remarkable circumstance that it should have remained unnoticed until so late a period ; and can only be accounted for by the fact that it is the only Hare found in Ireland, and that therefore the opportunity of comparison did not frequently occur. The fur of this Hare, from the absence of the long fine dark hairs, which constitute the beauty of the Common species, is considered of no value.

As the most obvious distinctive characteristic of this species consists in the relative proportion of the ears and head, I have preferred offering a larger figure of the head alone to a smaller one of the whole animal.

RODENTIA.

LEPORIDÆ.



ALPINE HARE.

VARYING HARE.

Lepus variabilis. Pallas.

Specific Character.—Light fulvous grey, becoming white in the winter; ears shorter than the head, permanently tipped with black; tail little more than half the length of the head.

- Lepus candidus*, JONST. Quad. p. 160.
 „ *albus*, BRISSON, Reg. An. p. 139, 2. JENYNS, Brit. Vert.
 p. 35.
 „ *timidus*, var. *alpinus*, ERXLEB. Syst. p. 329.
 „ *variabilis*, PALLAS, Glir. pt. 1. DESMAR, Mammal. p. 349, sp. 561.
 FLEM. Brit. Anim. p. 22.
Alpine Hare, PENN. Brit. Zool. I. p. 102, t. x. No. 21.
Varying Hare, SHAW, Gen. Zool. II. p. 201.

THIS species, which is diffused through a very extensive geographical range, is still confined to alpine districts, inhabiting the mountains both of the North and South of Europe.

It is found on the Alps, in Sweden, Norway, Lapland, and Kamschatka, and about Hudson's Bay. In our own islands, it occurs principally in the North of Scotland, where it inhabits the summits of the mountains; but it is occasionally found as far south as the mountains of Cumberland. It is, therefore, strictly an alpine animal, and its habits and the nature of its food accord with this location. It appears from the testimony of Sir Robert Sibbald, that this species was formerly an inhabitant of the Orkneys. "In Orcadibus reperitur crinibus candorem nivalem referentibus."* Low, however, asserts that it is no longer known there; nor is it, as I am informed, found in Zetland.

Intermediate in size between the Common Hare and the Rabbit, in manners it differs from them both. It makes no burrows, like the latter, but hides in the clefts of rocks or under stones. It has not the swiftness of the Common Hare; nor does it associate in warrens, like the Rabbit. Its ordinary food is similar to that of the other species; but during the winter it feeds upon several species of lichen, and on the seeds of different kinds of pine. As the winter approaches it leaves its high mountain residence, and descends to a warmer and more genial climate, though seldom so low as to be out of the reach of severe frost. At this period the fur undergoes a change as complete and of the same nature as has already been described of the Ermine; it becomes gradually and at length wholly white, with the uniform exception of the lips and the tips of the ears, which remain permanently black. This change certainly takes place in the existing fur itself. There is no autumnal change of coat; but the grey fur is whitened in patches, until it has altogether undergone this alteration of colour. This continues during the whole winter, and in the spring the white fur is

* Sibb. Scot. Illustr. II. p. 11.

thrown off, and a new coat for the summer dress makes its appearance. This is, I doubt not, the case with all the other mammiferous animals which undergo this hyemal change of colour. In Scotland the progress of the change is as follows :—"About the middle of September the grey feet begin to be white ; and before the month ends, all the four feet are white, and the ears and muzzle are of a brighter colour. The white colour gradually ascends the legs and thighs, and we may observe under the grey hairs whitish spots, which continue to increase till about the middle of October ; but still the back continues of a grey colour, while the eyebrows and ears are nearly white. From this period the change proceeds very rapidly ; and by the middle of November, the whole fur, with the exception of the tips of the ears, which remain black, is of a shining white. The back becomes white within eight days. During the whole of this remarkable change in the fur, no hair falls from the animal ; hence it appears that the hair actually changes its colour, and that there is no removal of it. The fur retains its white colour until the month of March, or even later, depending on the temperature of the atmosphere ; and by the middle of May it has again a grey colour. But the spring change is different from the winter, as the hair is completely shed."*

The final cause of this curious phenomenon has been already discussed in the description of the Ermine at page 153 of this work, and there can be no doubt that it is the same in all cases.

It is less timid than the Common Hare, and easily rendered familiar. When taken young, it becomes very tame, and is full of play and frolic. I had one living for a few weeks in last spring, for which I was indebted to the kindness

* Edinb. Phil. Mag. vol. II.

of Lord Francis Egerton, at whose instigation several interesting animals were sent me from the estates of the Duchess Dowager of Sutherland, in Sutherlandshire. This Hare was a good-tempered animal, and, I doubt not, would soon have become familiar. It was at the time undergoing its vernal change. The whole of the pure white had disappeared, the grey under coat was completed, and the longer brown hair was here and there produced. The figure which I now give was taken from that individual whilst living; but the colour is that of one near the completion of the winter change. I have retained the name *variabilis*, given to this species by Pallas, although that of Brisson, *albus*, has the priority. The latter name, however, could not with propriety have been retained, as it refers to a character which is only inflicted upon the animal by circumstances connected with climate and temperature; there can be no doubt that were it to remain in a mild temperature during the winter, the white colour would never appear,—as is, indeed, proved by the fact, that when the winter is unusually mild, the coat never assumes a pure unmixed whiteness. Were the name first assigned to it to be retained, Jonston's name of *L. candidus* must have the preference, as it was published in 1755, the year before Brisson's work appeared. Mr. Jenyns has, it is true, suggested that the *L. variabilis* of Pallas may be a different species, but does not state his reason for this opinion, and there is nothing in the terms of his definition which appears to me to warrant the distinction.

The Alpine Hare is smaller than the Common species; the head is smaller, the ears considerably shorter in proportion, as well as the tail, which is usually pressed closely to the rump, so as to be scarcely visible. The hinder legs are also shorter. The fur is full, soft, and woolly, and of a grey

colour, with a mixture of yellowish brown silky hair; the ears are grey tipped with black; the under parts of the body light grey; and the tail grey above, white beneath.

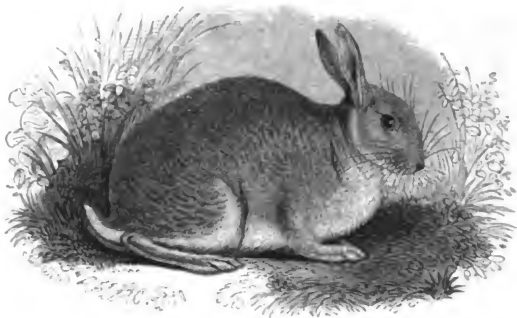
Dimensions :—

					Feet. In. Lines.
Length of the head and body	.	.	.	.	1 9 6
„ of the head	.	.	.	.	0 4 6
„ of the ears	.	.	.	.	0 3 3
„ of the tail	.	.	.	.	0 2 6



RODENTIA.

LEPORIDÆ.



RABBIT.

CONEY.

Lepus cuniculus. Linn.

Specific Character.—Brownish grey mixed with tawny; ears about as long as the head, without a black spot at the tip; tail conspicuous, brown above, white beneath.

Cuniculus, PLIN. Hist. Nat. VIII. MERREM. Pinax, p. 168. RAY, Syn. p. 205.

Lepus cuniculus, LINN. Syst. Nat. I. p. 72, 2. MULL. Zool. Dan. Prod. p. 4, 24. ERXLEB. Syst. p. 331. 3. DESMAR. Mammal. p. 348, sp. 560. FLEM. Brit. Anim. p. 21. JENYNS, Brit. Vert. p. 35.

Lapin, BUFFON, Hist. Nat. VI. p. 103, t. 1. FR. CUV. Mammif. II.
Rabbit, PENN. Brit. Zool. I. p. 104, No. 22, t. x. SHAW, Gen. Zool. II. p. 204, t. clxiv.

THE RABBIT so much resembles the Hare in all its principal characters, that Ray says, “Quod ad figuram corporis externam in omnibus ferè cum lepore convenit, magnitudine excepta.” There are, however, several other well-marked characters which distinguish it at first sight; such as

the comparative shortness of the head and of the hinder legs, with the grey colour of the body, the absence of the black tip to the ears, and the brown colour of the upper half of the tail. Its habit differs no less than its form. Unfitted by its organization from that long-continued and rapid course by which the Hare is distinguished, it seeks at once its safety and its shelter in deep holes of its own digging, and associates in large societies in places favourable for the easy excavation of its burrows, and for the necessary supply of food. In sandy heaths, covered with large bushes of furze, Rabbits often multiply to a great extent; as the soil is easily removed, and the dense furze affords at once a secure cover to their retreat, and a wholesome, ready, and never-failing food; for the young tops of the plants are found constantly eaten down, and the bushes present the appearance of a solid mass, with the surface even and rounded, as far as the Rabbits can reach them standing on the hinder legs. They make extensive inroads, however, upon corn-fields and plantations, in which they do considerable mischief by devouring the newly-sprung corn, and barking the young trees. They generally retire within their burrows during the day, coming abroad about twilight to feed.

A Rabbit-warren presents a curious and not uninteresting object. The ground everywhere pierced with deep and tortuous holes, the absence of all esculent vegetation around it, and the busy gambols or rapid retreat of the inhabitants, as they either play in security, or fly from the approach of danger, are circumstances which at once indicate the peculiar habit of the species, and present a scene of considerable amusement and interest. The extent to which the ground is sometimes broken up by these indefatigable little miners is astonishing. Varro relates that a town in Spain was destroyed by their excavations.

It is asserted that in the wild state the Rabbit is monogamous, and that the pair remain attached during their mutual lifetime. It begins to breed at the age of six months; it has several litters in the year, and brings from five to seven or eight at a litter, which are born blind and nearly naked; whilst those of the Hare are covered with fur, and have the eyes open at birth;—an admirable provision for the comparatively unprotected situation in which the latter little creatures are brought forth. When the female is about to bring forth her young, she forms a separate burrow, at the bottom of which she makes a nest of hair, taken from her own body. Every attempt to produce a breed between the Rabbit and the Hare has hitherto failed. The rapid multiplication of the Rabbit would soon render it one of the greatest scourges of our agriculture, were it not, on the one hand, destroyed by numerous birds and beasts of prey, and on the other, sought by man as an article of food, and on account of its fur, which is used for various purposes. The supply for this latter object would, however, be wholly unequal to the demand, were our furriers dependant upon the produce of our own country only. Hundreds of thousands of Rabbit-skins are annually imported here from Germany, and other parts of the northern and middle districts of Europe, where myriads of Rabbits are bred for this purpose.

The Rabbit is well known in a domesticated state. It then varies excessively in colour, being grey, brown, or reddish black, more or less mixed with white, and is very liable to albinism. The fur is also sometimes excessively long, as in the Angora Rabbit; and the ears in one breed, very much prized by the fanciers in these matters, become elongated, and droop so much, that they touch the ground when the animal is feeding. Some of the most esteemed varieties are figured

in the vignette. These are, according to the technical names of the fanciers, the Horn-lop, the Half-lop, the Oar-lop, and the Perfect-lop.

The Rabbit when tame ceases to pair; it also loses in some degree its instinct of burrowing: but if several be kept together in a convenient place, they show a disposition to scratch up the earth, and their progeny, after a few generations, resume in some degree their fossorial habits;—a fact which I can attest from my own experience when a boy.

The flesh of the tame Rabbit is very inferior to that of the wild; the latter being of a much higher flavour. The former is, however, more highly prized in London on account of its delicacy; but in many parts of the country the inhabitants would scarcely be persuaded to eat the flesh of tame ones.

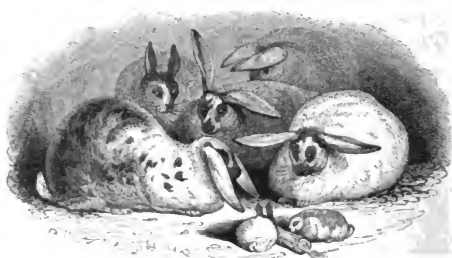
The etymology of the word Rabbit, 'or perhaps more properly Rabbet, is to be found in the Dutch *Robbe*, *Robbeken*, which Skinner supposes to be derived from the Latin *rapidus*. The ancient name Cony has its analogue in most of the European languages. In Italian it is *Coniglio*, in Spanish it is *Conejo*, in Portuguese *Coelho*: again, in the northern dialects, in German it is *Caninchen*, in Danish and Swedish *Kaning*, in Belgic *Konin*, in Welch *Cwningen*. These are all evidently from the Latin *Cuniculus*, which Pliny supposes to be taken from their habits, or rather their habitations;—"specus, qui sunt multiformes in terrâ, undè et nomen animali." This, however, appears a far-fetched and very doubtful origin; and I venture to suggest that it may with more probability be traced to the Greek *Κόνια*, *festino*, *curro*, or, less probably, to the root from which this word is itself derived, *Κόνις*, *cinis*, on account of its grey colour.

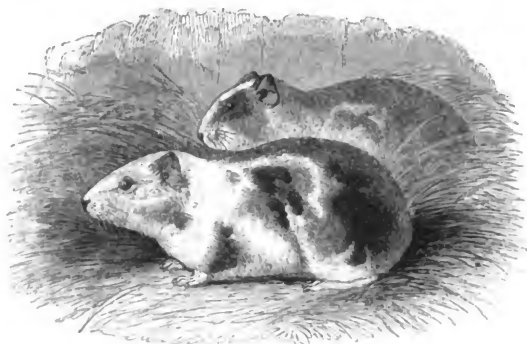
The general form of this species is fuller and rounder than that of the Hare, and the flanks are less contracted;

the head and ears are remarkably shorter, the latter particularly so, as are also the hinder legs. The fur is of a greyish brown colour; the neck reddish; the throat and belly white; ears brownish grey throughout their whole length; tail brown above, white beneath.

Dimensions:—

				Feet.	In.	Lines.
Length of the head and body	.	.	.	1	4	6
„ of the head	.	.	.	0	3	6
„ of the ears	.	.	.	0	3	8
„ of the tail	.	.	.	0	3	2





Genus, *Cavia*. Klein.

CAVY.

Generic Character.—Grinding-teeth $\frac{1}{2}:\frac{1}{2}$, compound, having one simple and one forked layer of enamel; toes four before and three behind; tail none.

RESTLESS CAVY.

GUINEA PIG.

Cavia aperca. Erxleb.

In its native state :—Dark reddish grey above, whitish beneath.

Cavia aperca, ERXLEB. Syst. p. 348, l. Gmel. Syst. Nat. Linn. l. p. 122.

„ *cobaya*, DESMAR. Mammal. p. 358, sp. 570.

Hydrocharus aperca, FR. Cuv. in Dict. des Sc. Nat. VI. p. 18.

Anæma aperca, „ Mammif.

Domesticated :—White, variegated with irregular patches of reddish and black.

Mus porcellus, LINN. Syst. Nat. I. p. 79, l.

Cavia porcellus, ERXLEB. Syst. p. 349, 2.

„ *cobaya*, SCHREB. Saugh. p. 617. JENYNS, Brit. Vert. p. 36.

Hydrocharus cobaya, FR. Cuv. in Dict. des Sc. Nat. VI. p. 15.

Cochon d'Inde, BUFFON, Hist. Nat. VIII. p. 1, t. i.

Guinea Pig, EDW. Glean. II. p. 294.

Variegated Cavy, SHAW, Gen. Zool. II. p. 17.

THE name by which this stupid, defenceless, and very harmless little animal is commonly known, is founded upon

an error, of which I have in vain endeavoured to trace the origin, for I do not find in any author by whom it is mentioned, any allusion to its being a native of Guinea. The country from which it truly derives its origin is the southern part of the South American Continent; Brazil, Paraguay, Guiana, &c. and it appears, as M. Frederic Cuvier has demonstrated, that the animal known by the name of *Aperca*, the *Cavia aperca* of authors, is the original stock from which it is derived. The accounts which have at various times been given of this animal, agree in representing it as one of an extremely low degree of intelligence. Its appearance, when at rest, is very short, thick, and heavy; but when running, its form becomes much elongated. It inhabits dry lands covered with low brushwood, and remains concealed during the day, coming abroad on the approach of evening to seek its food. It lives in society, and multiplies very rapidly; which alone can prevent it from soon becoming extinct; for it possesses neither cunning to avoid danger, strength to resist, nor swiftness to escape from it. Thus it is exposed to the attack of every beast or bird of prey, and is taken by the natives in considerable numbers for the sake of its flesh, which is said to be excellent food, resembling that of our Wild Rabbit. The colour of the fur, which is harsh and unfit for use, is a rich brown beneath, then yellow, and terminating with black, which occupies the greater part of the length of the hairs.

Such is the natural condition of an animal, which, in its domesticated state, is so universally known and so commonly bred, certainly rather on account of the readiness with which they multiply, and the facility with which they are kept, as well as some degree of prettiness in their external appearance, than for any profit or pleasure to be derived from them. Devoid of sense and docility, though incessant-

ly restless, tame from stupidity, and harmless from impotence, it perhaps possesses as few claims upon our interest and affection as any animal of equally innoxious habits. It is not even used as food, nor is its fur of any value, and the only pretended useful object to which it is put is to banish Rats from the place; these animals being supposed, but certainly without any reason, to have a particular antipathy to the Guinea Pig, and to leave in disgust the cellar or stable in which it is kept. On the other hand, the pretty distribution of its distinct and bright colours, the pure white ground varied with spots of red and black, renders a large assemblage of them a very pleasing sight; as all must acknowledge who have seen the numerous herd of them in the Zoological Society's garden. It varies much in the proportion of the different colours, and is said to be liable to albinism. This, however, I have never seen. They are often white, with the exception of the extreme margin of the tip of the ears, which is always of a blackish grey: but the true *albino* in this, as in every other animal, must not only be everywhere white, but the eyes must also be red, from the absence of the black pigment. It appears that the ears are more liable to retain colour in animals which become white by domestication, than any other parts. This is the case, as we have seen, with the present animal; and it is no less true of the Ox, and some others. The Guinea Pig is proved to have possessed, from a very early period, the same colours as now distinguish it; for F. M. Cuvier states, that in the original figures of *Aldrovandus*, which he had examined, and which were painted within half a century of the discovery of America, appear the same white, red, and black patches. It must, therefore, have been previously domesticated by the natives.

The fertility of this species equals, perhaps surpasses,

that of any other mammiferous animal. Although they do not acquire their full size until they are eight or nine months old, they begin to breed at six weeks or two months. The period of gestation is about twenty-five or thirty days; their ordinary litter is six or eight, sometimes as many as twelve, and they have young several times in the year. The young are born covered with fur, and with the eyes open, and almost immediately run about with considerable activity: they are suckled about twelve or fifteen days.

The food consists as exclusively of vegetable matters as that of the Hare or the Rabbit. It drinks but little, and by the action of lapping. The voice is very expressive of its different feelings. When perfectly contented, it is a soft and pleasing murmur; when alarmed, it is a sharp squeaking cry; and its desires are expressed by a slight grunting noise.

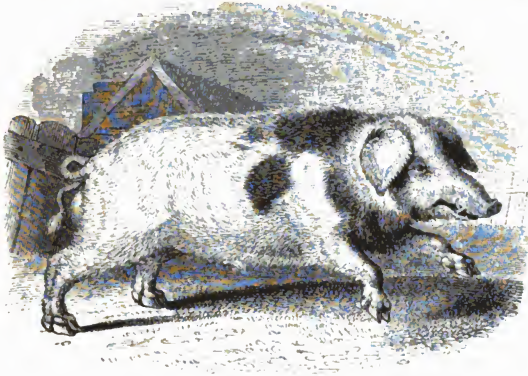
The passage from the mouth to the pharynx in the Capibara, *Hydrocharus*, an animal nearly allied to this, was discovered, by my friend Mr. Morgan,* to assume the form of a round funnel-shaped hole, capable of being closed by a sphincter muscle, so as to allow no particle of food to pass unless masticated to a pulp; and a similar structure was observed by him in the present species.

The general form is short and thick; the head obtuse, thicker and more robust in the male than in the female; the ears broad and rounded; the upper lip half divided; the body plump and compact: the legs very short; the anterior ones with four toes; the posterior with three, separate, and furnished with broad nails. No visible tail.

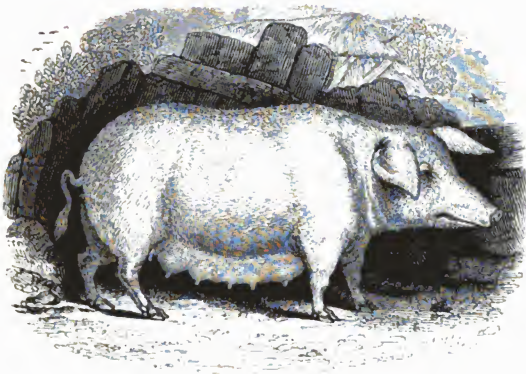
Dimensions:—

	Inch.	Lines.
Length of the head and body	10	10
„ of the head	2	10
„ of the ears	0	8

* See Linn. Traus. vol. XVII.

*PACHYDERMATA.**SUIDÆ.**

BOAR.



SOW.

* The author gives this family and the next provisionally only, as he is not yet well satisfied as to the distribution of the *Pachydermata*.

Genus, *Sus*. Linn.

Generic Character.—Canine teeth prismatic, exerted, recurved, both turned upwards; snout elongated, truncated, with a round movable disc at the extremity.

COMMON HOG.

M. BOAR. F. SOW.

Sus scrofa. Linn.

Specific Character.—Back bristly; tail hairy; no protuberance under the eyes. Tusks strong, triangular, of moderate length.

- Sus scrofa*, LINN. Syst. Nat. I. p. 102. ERXLEB. Syst. p. 177. DESMAR.
Mammal. p. 389, sp. 615. FLEM. Brit. An. p. 28.
JENYNS, Brit. Vert. p. 39.
„ *aper*, BRISS. Reg. Anim. p. 49.
Sanglier, BUFFON, Hist. Nat. V. p. 99, t. xiv.
Wild Boar, SHAW, Gen. Zool.

Domesticated:—

- Sus scrofa* β *domesticus*, ERXLEB. Syst. p. 179. GMEL. Linn. Syst. Nat. p. 217.
„ *domesticus*, BRISS. Reg. An. p. 106.
Cochon, BUFFON, Hist. Nat. V. p. 99.
Verrat, „ Ib. t. xvii.
Hog, PENNANT, Brit. Zool. I. p. 55.

THE origin of all our varieties of this useful animal is undoubtedly the Wild Boar, which still infests many parts of Europe, and was formerly a not unfrequent inhabitant of the woods and forests of our own country. It is, indeed, very generally diffused throughout the temperate and warmer parts both of Europe and Asia: it is a favourite object of the chase in India, and is said to be found in Syria, and the northern parts of Africa.

The Wild Boar is a powerful, savage, and dangerous animal: his long, curved, and sharp tusks, to which the thick skin of the Horse itself presents but a feeble defence, wielded by the strong muscles of his brawny neck, are capable of tearing open the body of his enemy at a single blow; and even the larger beasts of prey would scarcely be a match for him, did they not bring the exercise of stratagem in aid of

their strength and activity. The adult males live solitary and apart, selecting for their haunts the thickest and most impervious retreats of the forest, lying concealed during the day, and coming abroad in the evening in search of food, which consists chiefly, and by preference, of succulent vegetables, and different kinds of grain or pulse; though they do not refuse animal matter of almost any kind, when driven by hunger. The females, on the contrary, associate in large herds with their young to the age of two and three years, uniting for the purpose of mutual defence; for which object, when they are attacked, or apprehensive of approaching danger, the older and stronger ones form a line, presenting a bold and almost impenetrable front to the enemy; whilst the weaker and younger portion of the herd are placed in their rear: and it is found that the females, though ordinarily timid and inoffensive, show the most determined courage when their young are attacked, and defend them with the greatest pertinacity and fury.

In the early part of the year, at which time the male seeks the female, if two Boars chance to meet, the most furious encounters ensue. The time of gestation is about a hundred and twenty days, or rather more. The young are distinguished by brown longitudinal bands along the sides, which do not wholly disappear until the second change of coat. They continue to grow for five or six years, and the full duration of their life is from twenty-five to thirty years.

The chase of the Wild Boar has always been considered as a sport presenting the highest interest and excitement; and it is certainly one of the most dangerous. The old males are preferred to those of a less advanced age, as being less swift in their flight, both on account of their greater obesity, and the confidence which they feel in their own strength; they are also less dangerous, as their tusks are

much more curved, and are thus less capable of inflicting severe and well-directed wounds. When once at bay, the Boar becomes indiscriminately furious. He turns on his persecutors, and strikes at the nearest, often ripping open the belly of a Horse or a Dog ; and the hunter himself is in no little jeopardy if he be on foot, or his Horse have thus been disabled.

At the period when Britain was covered with forests, the Wild Boar was found in them as a native, and probably once in some considerable numbers. About the year 940, the laws of Hoel Dha direct that it shall be lawful for the chief of his huntsmen to chase the Boar of the woods from the fifth of the Ides of November (9th) until the Calends of December (1st).—Cap. xxi. sect. 14. In the next century, the numbers had perhaps begun to diminish, since a forest law of William I, established in A.D. 1087, ordained that any who were found guilty of killing the Stag, the Roebuck, or the *Wild Boar*, should have their eyes put out ; and sometimes the penalty appears to have been a painful death. It appears, indeed, that Charles the First turned out some wild swine in the New Forest for the purpose of restoring the breed to that royal hunting-ground ; but they were all of them destroyed during the Civil War. A similar attempt has, I believe, been lately made in Bere Wood, in Dorsetshire ; but one of the Boars having injured a valuable Horse belonging to the worthy Nimrod who exhibited this specimen of sporting epicurism, he caused them to be destroyed.

The Boar, however, has its name immortalised as an inhabitant of these islands, by having given origin to the name of many places in different parts of the country, and by its introduction into the armorial bearings of many distinguished families of every division of the kingdom. My friend Mr. Hogg writes thus to me on the former subject :—“ The

village of Brancepeth; and the adjoining hill, called Brandon, in this county (Durham), took their names from a Wild Boar or *Brawn*, which is recorded to have been a terrific beast, and the dread of the whole neighbourhood; his *den* being on *Brandon* (brawn-den) hill, and his usual track or *path* leading through the woods of *Brancepeth* (Brawn's path). Tradition states that one Roger Hodge, or Hoodge, valiantly slew the monster, and delivered the district from his ravages. The seal of this illustrious Roger still remains, and represents a *Boar passant*."*

There are several different breeds of the Domestic Hog, some of which are preferred for a particular quality of their flesh; others for their size, or for their great productibility, and the cheapness and readiness with which they may be reared and fattened. The largest breed in this country is the Rudgwick; and as these are susceptible of great obesity, they become of an enormous size. The Irish Hog is a long, thin, rank, and haggard animal, and is not considered as a very profitable breed, at least in England; but when crossed with the Berkshire, or some similar breed, it is susceptible of great improvement, both in the quality of its flesh, and the facility with which it is fattened. There is in the Hebrides a very small breed, which is considered by Walker to be original there: they are of a uniform grey colour, rather shaggy, the hair and bristles being unusually long. They are suffered to wander about the hills without care or shelter throughout the year; they feed upon such herbage and roots as they can find, and doubtless occasionally on worms or insects, or any dead animals that come in their way. In the autumn they are said to be good eating, but are seldom taken up to be fattened. The Orkney breed is of similar diminutive size, seldom exceeding sixty or seventy pounds in weight. Like those of the Hebrides, they have the entire

* See Surtees' History of Durham, III. p. 284.

run of the country, frequenting the hills, and feeding casually. When admitted among the corn-grounds, says Low, "they make vast havock by rooting; seldom leaving till they throw up a ditch large enough to bury half a dozen of them; which standing full of water all the winter, does vast hurt to the grounds, though our farmers stiffly maintain the contrary." This author adds, that "of the hair the inhabitants make those ropes with which they let one another over the steepest and highest rocks in quest of wild-fowl and their eggs; giving the preference to them over the best hempen ropes, as being less liable to be worn asunder by the rugged edges of the rocks. When killed from the mountains, they make but ordinary meat, and yet they are seldom otherwise fed; but when properly managed, they make very good pork and ham."*

The introduction of the Chinese Hog has effected an astonishing change in the native breeds, wherever they have been crossed by it. This very remarkable variety deserves particular mention, not merely as a source of great improvement in an important branch of stock, but also as connected with a zoological question of great interest. M. Frederic Cuvier believes that it is derived from a wild stock specifically distinct from the Common Wild Boar; and could this be proved, it would go far to settle the long-disputed and difficult question of specific distinctions, as connected with the production of infertile progeny: for in that case, as the breed between the Chinese and the Common Hog is perfectly fertile, the argument for specific distinction founded on that circumstance at once falls to the ground. On the other hand, however, those who contend that the production of fertile young is itself a proof of specific identity in the parents, would of course hold that the supposition of the celebrated naturalist just mentioned is erroneous. upon this very

* Low, *Fauna Orcadensis*, p. 10.

ground. The observations which have been already made on the identity of the Wolf and Dog, bear on this question, and render it unnecessary that it should be further pursued at present.

The Chinese Hog is of small size, short and thick; the belly deep, and when fat, nearly reaching the ground; the legs short and fine; the head very short, and the neck thick. Its influence on the different breeds with which it has intermixed, has been greatly to improve them in the delicacy of the flesh; but whilst the pork of the Chinese cross is certainly excellent, some of our own breeds are still esteemed as yielding by far the best bacon and hams.

In attempting to produce a cross, or in perpetuating any particular breed of Swine, it appears that the same precaution is necessary as has already been alluded to in treating on the Dog: the female, namely, must not have had any previous litter by a Boar of a different breed from that which it is intended to produce; for, as in the Dog—and, as we shall see hereafter, in the Horse also—so in the present case, the subsequent progeny of the mother will always partake more or less of the character of the father of the first offspring. A short account of an occurrence of this kind is given by Mr. Giles in the *Philosophical Transactions* for 1821.

This important kind of stock is especially valuable to those persons whose other occupations furnish a plentiful supply of food at a trifling expense; as the keepers of dairies, brewers, millers, &c., the very refuse of whose customary produce will serve to keep a considerable number of these useful animals. For much practical information on these matters, the reader is particularly referred to Henderson on Swine, and Professor Low's *Elements of Practical Agriculture*.

The etymology of the common names of the Hog and its produce is somewhat interesting. The conversion of the

Saxon *Swine* into the Norman *Pork*, when fitted for the table, is seized upon by Sir Walter Scott in his own felicitous manner, in the opening scene of his inimitable *Ivanhoe*. *Swine* is the Anglo-Saxon *Swin*; *Sow*, Anglo-Saxon *Sugn*, Danish *Souwe*; *Boar*, Anglo-Saxon *Bar*. *Hog* is of very uncertain origin; Skinner says it is a two years' old Sheep, from the Anglo-Saxon *hogan* (curare), because at that age they require particular care and attention: this, however, is very far-fetched. *Pig* is from the Danish *bigghe*, *vigghe*, *værcken*, and German *færkel*, which are probably from the Latin *Porcus*.*

The following dimensions of a very old and unusually large Wild Boar are given from Desmarest:—

	Ft.	In.	Lines.
Length of the head and body	5	9	0
„ of the head	1	4	0
„ of the ears	0	5	0
„ of the tail	0	10	4

The ordinary dimensions of an individual of four years' old, according to the same authority, are as follows:—

	Ft.	In.	Lines.
Length of the head and body	3	0	0
„ of the head	0	11	3
„ of the tail	0	7	0

* See Encyc. Metrop.



PACHYDERMATA.

EQUIDÆ.

Genus, *Equus*.

HORSE.

Generic Character.—Tail covered everywhere with long hairs ; no dorsal line : callosities both on the fore and hinder legs.

HORSE.

Fem. MARE. Young, FOAL, COLT.

Equus caballus. Linn.

The only known species.*

- Equus caballus*, LINN. Syst. Nat. I. p. 100. ERXLER. Syst. p. 207. DESMAR.
Mammal. p. 416, sp. 652. FLEM. Brit. An. p. 27.
JENYNS, Brit. Vert. p. 39.
Equus, PLIN. Hist. Nat. lib. VIII. c. xlii. &c. RAY, Syn. Quad.
p. 62.
Cheval, BUFFON, Hist. Nat. IV. p. 174.
Horse, PENNANT, Brit. Zool. I. p. 1. t. i.
Common Horse, SHAW, Gen. Zool. II. p. 419, t. ccciv.

THE early history of the Horse is involved in much obscurity. It is, indeed, only in the Sacred Writings that we have any probable trace of its original subjugation, or even a hint to what nation the world is indebted for so valuable a boon. Its natural history is no less doubtful ; for there is every reason to believe that it has long since ceased to exist in a state of nature, and that, like some other domestic

* It will be seen that I have followed Mr. Gray in considering the Ass as belonging to a distinct genus from the Horse.

animals, not a single indication remains by which we can judge of the form, the colour, or the habits by which it was characterised before it became the servant of man, or how far it may have differed from the present domesticated races. That the Horse is of Eastern origin, appears from the scriptural testimony to which I have just alluded ; and that the Egyptians were the fortunate people who first reduced it to the obedience of servitude, appears very probable from the same indubitable authority. The first mention of the Horse occurs about six centuries and a half after the Deluge, during the wise and politic administration of Joseph in Egypt ; who, when the famishing inhabitants had expended their money in the purchase of corn, “brought their cattle to Joseph, and Joseph gave them bread in exchange for Horses and for the flocks,” &c. By this it would appear not only that the Horse was commonly known and possessed by this people at that early period, but that the acquisition of Horses was sought after by the government as an object of importance. Very shortly afterwards,—and this, too, occurred in Egypt,—we find the venerable patriarch Jacob, in his dying address to his sons, employing this figure : “Dan shall be a serpent by the way, an adder in the path, that biteth the Horse heels, so that his rider shall fall backward.” And it is a remarkable circumstance that this early allusion to the Horse should refer to him as being ridden, and not as a beast of draught. Again it occurs at the transportation of the body of Jacob by his son Joseph from Egypt to Canaan for burial : “There went up with him both chariots and Horsemen.”

The employment of numerous chariots by Pharaoh in pursuit of the departed Israelites is confirmatory of this opinion ; and the testimony of the earliest profane writers is in direct accordance with it. If, then, from this evidence it appears at

least highly probable that the Egyptians first reduced the Horse under human subjugation, it is to the same country, or at least to those parts of Africa which were in close relation to it, that we may reasonably look for its native locality before that event. The long-acknowledged superiority of the Horses of Arabia is no proof that they were indigenous to that arid country in a wild state ; for there is great reason to conclude that it was only at a comparatively late period that they were employed by that people. Whilst Solomon was receiving from Arabia treasures of various kinds, it was from Egypt only that his Horses were brought : and so highly were they valued by this magnificent and luxurious king, that notwithstanding the Divine prohibition, “ that the king shall not multiply Horses to himself, nor cause his people to return into Egypt, to the end that he should multiply Horses,” it is stated that he had no less than forty thousand stalls of Horses for his chariots, and twelve thousand Horsemen. There appears great probability, therefore, in the opinion that Egypt or its neighbourhood is its original country ; and still more, that this extraordinary people first rendered it subservient to man, and subsequently distributed it to other countries. The Ethiopians are particularly mentioned by Herodotus, as having furnished a portion of the cavalry to the army of Xerxes, in which they were joined by a body of the natives of India, who are stated to have accompanied him on horseback, and with chariots of war.

The wild Horses which are now to be found in several parts of the world, afford us no clue to the clearer elucidation of their original character. They appear in all cases to have been derived from a domesticated stock. On the plains of Tartary there still exist numerous troops of these animals,

which evince, however, no mark of being originally indigenous to that country. In South America these herds are still more numerous, and are very clearly traced to the Horses which the Spaniards carried thither from Europe in their early visits to that continent. The accounts which have been given of these Horses by various travellers are highly interesting, as they offer the only hint at the habits of the species in its original condition.

From these accounts it would appear that they associate together in herds or troops to the number of several thousands: they spread about to feed, but on the appearance of any danger they instantly congregate together, and appear to put themselves under the direction of a leader. On the approach of an enemy, they close into a dense crowd, and attacking the intruder, trample him to death; or, like many other gregarious animals, the females, the young, and the weak are placed in the rear, and the stronger individuals standing between them and danger, give the enemy such a reception with their heels, as in ordinary cases to destroy him. The Jaguar is perhaps the most dangerous enemy, excepting man, with which they have to cope; and even this savage and powerful beast is to be dreaded only when he falls in with a solitary individual. The only paces of the wild Horse are the walk and the gallop.

These wild Horses are taken by the natives by means of an implement called the *lasso*, which is a long tough thong, with a running noose at the extremity. This is thrown with the most astonishing precision under the hinder legs of the object of pursuit, which is thus thrown with great violence on its side. The conqueror then forces a bit into his mouth, places a saddle on his back, and vaulting into his seat, sits secure and firm, notwithstanding all the efforts of the Horse to unseat him; and in a very short time he is reduced to the

most complete obedience. The Mare is never ridden, but is now and then killed for food.*

It is a question of no little interest, whether there are any circumstances connected with the supposed original locality or habits of this animal, to account for its rapid and entire subjugation; though, in the absence of all historical evidence, any notions on this subject must necessarily be but conjectural. There can be no doubt that when once the value of the Horse was known to a people so highly civilised and so extensively connected with other nations as the Egyptians, it would become an object of the highest interest to secure to themselves the possession of so important an acquisition; and we have already seen that this was the case even as late as the time of Joseph. Whether, therefore, the Egyptians themselves, or some neighbouring half-barbarous nation, were the actual enslavers of the noble beast, the demand would for a long time be far greater than any supply which could be afforded by breeding. It is, then, probable that they continued, for a considerable period, to be obtained by capture from the wild herds which had furnished the earliest examples. The breeding of Horses is necessarily but slow, as the Mare produces ordinarily but one foal at a birth, and but once in the year: they must, from their structure, have lived on plains, with no other means of security than their swiftness, in which they would be speedily outstripped by those of their own race which had been trained and exercised to the course. Thus we find in the present day that the American Wild Horses are obtained at pleasure by the native inhabitants when mounted on horseback; and indeed so readily, that it is scarcely thought worth while to be at

* For much interesting information on this subject, I beg to refer to Miers's Travels in Chili, to Captain Head's Journey across the Pampas, and to Captain Basil Hall's Journey to Peru and Mexico.

the expense and trouble of keeping and breeding them ; nor are those which are captured for temporary use retained after the object has been effected. Whatever may have been the immediate means, therefore, employed for their capture on the plains of Africa,—whether the same circumstances pointed out to the ancient hunters of the Eastern world, any similar plan of operation to that which is found so useful to those of the present day, in the Western hemisphere,—it is evident that they became a source of extensive profit to the Egyptians, and were probably obtained by them in great numbers to be exported and sold to other nations. From these considerations, and others which will readily suggest themselves, the entire disappearance of the original stock may reasonably be traced to the combined operation of the circumstances above stated : namely, the great value of the acquisition, the rapid demand both for the purposes of immediate use and of commercial profit, the slow and inadequate supply by breeding, and the facility with which they were taken.

In this country the Horse has always been an object of the highest interest ; and our ancestors were, from the earliest periods, celebrated for the excellence of their breeds of this useful animal. When Cæsar landed on the shores of Kent, he was received by the cavalry and war-chariots belonging to the defending army. How long before this period the barbarous inhabitants of our island had known the use of this powerful constituent of the material of an army, is of course beyond the limits of conjecture ; but from this time occasional mention is made of the excellence of British Horses. The Saxons appear to have paid great attention to the Horse, and to have been fully aware of the importance of improving the breed. The cognisance which waved on the Kentish royal banner was a white Horse. Athelstane

thought the preservation of the native breed of sufficient importance to call for a legal enactment to prevent the exportation of Horses, excepting as presents. The employment of Saddle Horses in this country appears, from the testimony of Bede, to have been introduced in the early part of the seventeenth century.

Of what character were the native breeds up to the Norman Conquest, it is now impossible even to guess. That they were powerful and well suited to the purposes of war, both by their stature and training, we have the testimony of Cæsar before mentioned, and of subsequent historians ; but the first attempt on record to improve the native stock, by the introduction of foreign blood, occurred during the reign of William the Conqueror, when Roger de Belesme, Earl of Shrewsbury, imported the elegant and docile Spanish Horse, and bred from it on his estates in Powis land ; and it is recorded that the Horses of that part of Wales were long celebrated for their swiftness,—a quality which they had doubtless derived from this happy mixture of blood. The heavy panoply of mail, however, with which the warriors of this and of succeeding ages at once protected and loaded both themselves and their steeds, sufficiently attests that the cavalry must have been mounted on Horses of great strength and size ; and there is no doubt that until the universal employment of fire-arms rendered such a protection in a great measure unavailable, the speed and figure of the War Horse must have been sacrificed to the qualities of power and endurance. The beautiful Horses on which many of our light cavalry regiments are now mounted, although endowed with considerable strength, would have been crushed beneath the weight of metal by which both the knight of olden time and his Horse were so heavily laden.

The selfish John, fond to excess of the show and excite-

ment of the tournament, and of the pomp and circumstance of military array, paid great attention to the improvement of the superior breeds, and doubtless conferred a lasting advantage on the country by the importation of no less than a hundred Flanders Stallions ; which probably laid the foundation of that character for strength and size which has always belonged to our Horses both of war and labour. The frequent ordinances which occurred in various reigns against the exportation of Horses, excepting, in some cases, those of very low price, show the importance which several of the monarchs of this country have attached to this subject ; and the tyranny of Henry the Eighth exhibited itself in a very characteristic point of view, by the oppressive edict by which he endeavoured to keep up the standard size and excellence of these animals. The result of this absurd tyranny was the serious diminution of their numbers, without any counterbalancing improvement in the breed.

It is unnecessary to trace the partial admixture of finer blood produced by the occasional importation of Lombard or Spanish Stallions. Whilst the cavalry of the country continued to be loaded with the heavy armour already alluded to, it was impossible that any material advance could take place in the speed and elegance of their Horses ; and hence it has been very truly observed, that “when the musket was substituted for the cross-bow and battle-axe, and this iron defence, cumbrous to the wearer and destructive to the Horse, was useless and laid aside, the improvement in the British Horse in reality commenced.”

The introduction of Horse-racing—or rather, the reduction of it to a regular system—excited the necessary emulation amongst its more ardent followers ; and it is to the predilection for this sport evinced by James the First, and his undoubted judgment in these matters, that we are indebted for

the first attempt to introduce the pure Arabian blood into this country. The experiment does not appear to have been met with the support it deserved : but after the lapse of many years, during which some additional advantages were gained by the occasional importation of Turkish and Barbary Horses and Mares, the Arabian was again resorted to, as lately as the reign of Queen Anne ; and Mr. Darley bred from the Arabian which has been since known by his name. The advantages which were soon perceptible from this admirable admixture of blood gradually established the superiority of this over every other breed ; and the amelioration is perceptible not in the blood-races only, but, to quote the words of one of the best informed writers on the subject, “ by a judicious admixture and proportion of blood, we have rendered our Hunters, our Hackneys, our Coach—nay, even our Cart Horses, much stronger, more active, and more enduring, than they were before the introduction of the Race Horse.”

The various breeds of Horses which are employed in England may be divided into the following principal forms, of each of which there are several varieties : the Pony, the Galloway, the heavy Draught Horse, the Coach Horse, the Roadster or Hackney, the Hunter, and the Race Horse. As some of these are merely the production of a mixture between the more distinct varieties, it is unnecessary to do more than give some account, and that a very succinct one, of some of the latter, referring to the numerous valuable works on the Horse for a more particular detail. Those which I have selected for illustration are the Pony, the Dray Horse, the Hunter, and the Race Horse.



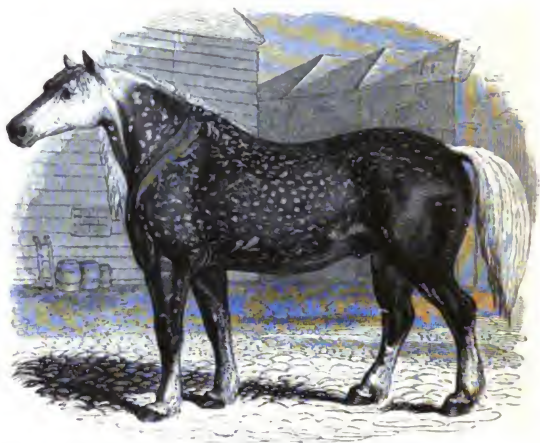
SHETLAND PONY.

THE islands of Zetland have long been celebrated as producing a race of Ponies at once docile, hardy, strong, and beautifully formed. The Sheltie has a small head, a fine neck and throat, a firm stocky form, fine legs, and neat round feet. It is capable of considerable exertion, and of long endurance of fatigue; and one is on record, of only nine hands high, which carried a man of twelve stone forty miles in one day. The general height of this breed is from eight hands to nine and a half. We read of one of only seven hands and a half, which being presented to a gentleman, was carried home in his gig; and the following circumstance may perhaps be considered as a fair counterpart of that story:—I was some time since passing rather late in the evening through one of the streets in the immediate neighbourhood of London, and observed two men walking briskly along, with a beautiful little Pony trotting by their side, without either bridle or halter. Presently one of the men, who seemed on the best possible

terms with his little steed, passed his arm round its body, and lifting it with ease from the ground, carried it for some distance; then setting it down, he threw one leg over its back, and half rode, half walked, with his feet touching the ground on either side. After a time he again carried the Horse a short distance; and at length coming to a large gin-shop, carried it up the steps, and disappeared with it at the door. Whether he made it partake of his cheer, I know not.

There are several other breeds of Ponies, of various degrees of excellence, in different parts of the kingdom; as the Welsh, the Dartmoor, the New Forest, and some others, of which it would be tedious to speak.





THE DRAY HORSE.

THE Draught Horse varies exceedingly in size, form, proportion, and in every other quality, from the miserable, stooping drudge of the dung-cart, to the splendid, high-actioned Coach Horse, or the majestic Dray Horse of the opulent London brewer. From a portrait by A. Cooper of one of the latter, formerly a favourite Horse in the possession of Messrs. Barclay, the present figure is taken; and I have to acknowledge the great kindness of Mr. Barclay, jun. for the facilities which he afforded to Mr. Dickes in making the drawing. The contour of this noble animal can scarcely be surpassed, and exhibits a very great improvement upon the mere ponderous solidity of the majority of this breed. These Horses sometimes stand as much as seventeen hands high; and their bulk is proportionally great. The great fault in the heavy Draught Horse, whether in the London dray or the

road waggon, is its slowness; but this is greatly remedied by the introduction of a more active cross. The old Suffolk crossed with the Flanders is greatly esteemed, and has lately been much used, both for Waggon and Dray Horses.

“A Dray Horse,” says the same excellent authority whom I have often quoted, “should have a broad chest, and thick upright shoulders; the more upright the collar stands on him the better; a low forehead, a deep and round barrel, loins broad and high, ample quarters, thick fore arms and thighs, short legs, round hoofs broad at the heels, and the soles not too flat.”*

The docility of this breed is as complete, though not perhaps so showy, as that of the lighter and more active kinds; and few persons can have long perambulated the streets of the metropolis without witnessing the complete control which the draymen exercise over their pompous and gigantic Horses. I have often watched with delight the facility with which one of them will back a waggon or a large cart into an archway but a few inches wider than the vehicle itself, guided only by the voice of his accustomed driver, aided perhaps by a few slight movements of his hand.

The Waggon Horse is but a lighter kind of the same breed.

The Coach Horse, formerly partaking much of the character of the heavy Waggon Horse, although still possessing equal height, with some of the general fulness of carcass, and with perhaps still greater strength, is vastly improved in speed and action. The origin of the better kind of Coach Horse is the Cleveland bay. This is crossed by a three-fourths or a thorough-bred Horse of sufficient substance and height, and the produce is the Coach Horse most in repute, with his arched crest and high action.

* Library of Useful Knowledge, “The Horse,” p. 41.



THE HUNTER.

THERE is not perhaps, in any country, a breed of Horses which possesses the combined qualifications of speed and endurance in an equal degree with the English Hunter. More beautiful perhaps than even the Racer, if it do not rival that fine animal in its almost incredible feats of speed, it greatly surpasses it in the unwearied perseverance and constancy of its course. The spirit and eagerness with which this noble animal enters into the favourite sport of his master is well known. Many a valuable Horse, disdaining to yield, has pressed on in the chase—not perhaps urged by his rider, but of his own free love of the excitement—until he has fallen exhausted by fatigue, never to rise again. When we read of “an uninterrupted hunt of four hours and twenty minutes” with the killing speed of a Stag-hunt, we can scarcely be surprised that “one Horse should have dropped

dead in the field, another before he could reach the stable, and seven more within a week afterwards.”*

It is obvious, however, that although the Hunter requires a greater degree of enduring strength than the Racer, to the acquisition of which must be sacrificed a certain degree of speed, this very quality will be best obtained by a rather near approach to the thorough-bred Horse. A Hunter should be three-fourths, or even seven-eighths bred, in order to be equal to the Stag or the Fox chase, especially in an open country. It should be from fifteen hands and a half to sixteen hands high; the head rather small; the neck thin; the chest ample; the forehead a little raised; the barrel round and full; the body compact; the legs muscular, and shorter than in the Race Horse; the loins broad; the thighs thick and muscular; the feet well formed, and firmly and straightly placed. Such are some of the points essential to the Hunter; and to these must be added the important requisites of temper and courage.

For a more detailed account of this beautiful and useful race of Horses, I refer again to a work from which perhaps more sound practical information may be obtained on the Horse than in any other of a similar description:—it is the volume on the Horse published by the Society for the Diffusion of Useful Knowledge; the reputed author of which is too well known and too deservedly respected to require any eulogium either of himself or of his excellent book in this place.

* See page 211.



THE RACE HORSE.

THAT the introduction of Eastern blood to our native breeds of Horses has been the principal cause of the rapid improvement in their value which has taken place of late years, has been already stated, and may be demonstrated by historical testimony ; and it is equally certain that but for the interest taken in the race-course, the mere object of obtaining a better class of useful Horses would scarcely have proved a sufficient inducement for the importation of the stock by which this improvement has been produced. Whether or not the blood of our finest Racers be pure Eastern, or a mixture of the Arabian or Barb with the best of our old English stock, can scarcely, with all the accuracy of our turf genealogy, be positively ascertained : but it is undoubted that the most celebrated Horses that this country has ever produced are traceable from son to sire back to some or other of the well-known Arabian, Barbary, or Turkish

Stallions which have at different times been imported. The celebrated Eclipse could boast of the blood of the Darley Arabian, the Lister Turk, the D'Arcey White Turk, Hut-ton's Bay Turk, the Leeds Arabian, and the Godolphin Arabian : and in other cases a similar preponderance at least of foreign blood is to be traced. The almost inconceivable fleetness of that extraordinary Horse is too well known to require recital : it was so superior to that of all his rivals, that it can scarcely be said to have been fairly put to the test ; it may probably have equalled that of the flying Childers, which, however, is acknowledged to have been the fleetest Horse the rate of whose speed has ever been ascertained. He has been recorded to have run round the course at New-market, little less than four miles, in six minutes and forty seconds ; but this was not the utmost of his speed, for he was computed to pass over eighty-two feet and a half in a second, or nearly a mile in a minute.

The importance of the influence of the sire in breeding Horses is in no point more clearly proved than by the fact that the progeny of the most celebrated Horses have generally sustained the reputation of their sires. Thus the descendants of Eclipse numbered no less than three hundred and sixty-four winners ; and those of Matcher, Highflyer, and other celebrated Horses, have partaken of the same inherited excellence.

If the emulation of the Hunter be exhibited by the ardour with which he spontaneously follows the chase, partaking with his rider not in the fatigue and labour only, but in the excitation and enjoyment of the sport, the Race Horse enters no less intensely into the spirit of the course, straining every muscle, and evincing almost the energy of madness in his attempts to reach the winning-post before his nearest competitor. Forrester, a celebrated Horse in his day, "had won

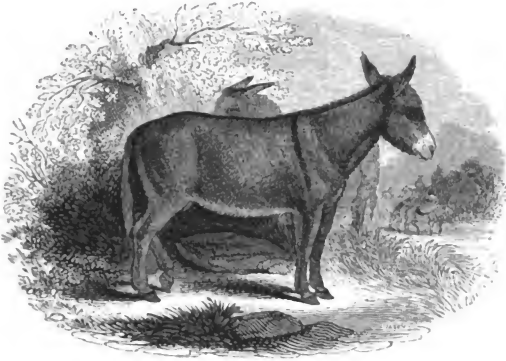
many a hardly-contested race ; at length, overweighted and overmatched, the rally had commenced : his opponent, who had been waiting behind, gained upon him ; he overtook him, and they continued quite close to within the distance. It was a point that could scarcely be decided ; but Forrester's strength was failing,—he made one desperate plunge, seized his antagonist by the jaw to hold him back, and could scarcely be forced to quit his hold."

" The Racer is generally distinguished," says the author whom I have before quoted on this subject, " by his beautiful Arabian head ; his fine and finely-set-on neck ; his oblique lengthened shoulders ; well-bent hinder legs ; his ample muscular quarters ; his flat legs, rather short from the knee downwards ; and his long and elastic pastern." It is, however, a fact, that some of the most celebrated Horses have been far from exhibiting a form at all in correspondence with their excellence on the turf ; many of them having shown remarkable deviations from perfect symmetry.



PACHYDERMATA.

EQUIDÆ.

Genus, *Asinus*. Gray.

Generic Character.—Tail furnished with long hair towards the extremity only; callosities on the fore legs, none on the hinder ones.

THE ASS.

Asinus vulgaris. Gray.

Specific Character.—Grey; a longitudinal dorsal line, and a transverse band over the shoulders, both black.

Wild:—

Asinus sylvestris, PLIN. Hist. Nat. VIII. cap. xxx.*Onager*, IB. l. c. cap. xlv. JONST. Quad. XX. t. vii. viii.

Wild and domestic:—

Equus Asinus, LINN. Syst. Nat. I. p. 100. ERXLEB. Syst. p. 212. DESMAR. Mammal. p. 414, sp. 651. JENYNS, Brit. Vert. p. 39.*Asinus vulgaris*, GRAY, in Zool. Journ. I. p. 244.*Asne*, BUFFON, Hist. Nat. IV. p. 377.*Ass*, PENNANT, Brit. Zool. I. p. 13.

PATIENT, but obstinate and stubborn—endowed with very limited intelligence, but indefatigable and enduring in labour,

the Ass has become the drudge of man, and is sunk into abject and hopeless slavery. Unlike the Horse, whose noble nature almost fits him to be the humble companion of his master, the single virtue of patience seems to be the only redeeming excellence, in an animal whose usefulness depends exclusively upon negative qualities. The meek, enduring expression of its countenance—the unmoved and unresisting serenity with which it bears the various cruelties and indignities which are too often inflicted upon it, have given to it, in the eye of the sentimentalist and the poet, a character which its intellectual inferiority is but ill calculated to support ; and it requires the deep feeling and exquisite pathos of a Wordsworth to invest it with poetical interest, or the fanatic sentimentalism of a Sterne to feel, as that clever but affected writer expresses it, that “with an Ass he could commune for ever.”

On the other hand, the very absence of that higher intelligence and those more active and conspicuous traits of excellence which belong to its noble congener renders it an important servant to numbers, whose means will not allow of their possessing a Horse of even the least valuable character ; and the humble qualities upon which its usefulness depends, may undoubtedly be much increased by constant kindness of treatment. It happens, indeed, in this case, as in most others in which the treatment of animals is concerned, that kindness and humanity ensure their own reward ; and that docility and obedience are far better promoted by gentle usage and liberal feeding, than by stripes and starvation.

Individuals are, however, occasionally met with, which exhibit a far higher character than that which has just been assigned to the species generally in a domesticated state. The most remarkable instance of this kind within my own

knowledge was that of an Ass in the possession of an ancestor of mine, who from age and disease was obliged to give up riding on horseback, and betake himself to the easier exercise of this animal's more gentle paces. 'General,' for that was the name of the Ass in question, was of an unusual stature, at least for those bred in this country. His pace was easy and free, but swift perhaps beyond example; and many times before my grandfather obtained him, he had been in at the death, after a tolerably hard Fox-chase. Matches had often been made, and Asses of unusual power and fleetness had been placed against him; but he never met with a competitor. He was docile also, and gentle; and having survived his master, to the comfort of whose later days he had essentially contributed, he spent the remainder of his life in ease and idleness, and at his death was buried with due honours in his own little paddock.

The Ass is one of the few domesticated animals respecting the origin of which there is no doubt, being well known up to the present day in its original wild state. According to the observations of Pallas, who has given us the most certain information on its habits, it associates in numerous troops, and migrates with the change of season, passing the colder months of the year in the warm climate of Persia and the interior of India, and returning in the hot season to the southern parts of the Russian empire. On the retreat of these troops to the South, they leave traces of their ravages of a *werst* in breadth. The Wild Ass is larger than the Domestic, at least as we have it in this more northern region; where, however, the climate, the poor supply of food, and the wretched treatment to which it is subjected, have reduced its size far below that of the Asses of Spain and of Northern Africa. It has also rather shorter

ears, the grey colour is softened by a tint of yellowish brown, and the dorsal and humeral fascia are brownish black. The character of the animal too, in all the wild freedom of its native habits, is very different from the stolid indifference which belongs to the Domestic race. It is excessively swift, untameably savage, and has all the activity and quick instinct of the Wild Horse. It is remarkable that notwithstanding the length of time that has now elapsed since the original domestication of the Ass, it has altered less from its pristine form and colour, and is less liable to variation in those respects, than any other domestic animal. It still, in all climates and under all circumstances, retains the general tone of colour which belongs to the native race, as well as the black line down the back, and the transverse fascia across the shoulders; and the diversities of colour which different individuals present are for the most part merely different shades of the same primitive hue. It is occasionally found quite white; but this arises from true albinism.

It appears that as the Domestic Ass advances northward, it becomes deteriorated. In the genial warmth of its native climate, it is a far superior animal to that which we are accustomed to see in this country. In various parts of Asia and Africa, and in the South of Europe, it still exhibits this superiority; and in Spain particularly, the male Asses which are bred and selected for the purpose of producing Mules are really beautiful animals. Its progress northward has not been rapid: its introduction into this country, however, took place early; for it is mentioned in the reign of Ethelred, when its price was as high as twelve shillings, and again in the time of Henry the Third. Notwithstanding this, it appears to have subsequently become extinct here; for Holingshed distinctly states that in the

time of Elizabeth "our lande did yeelde no Asses." Its restoration to England is attributed by Pennant, with much probability, to our intercourse with Spain during the reign of Mary. It would appear by the testimony of Linnæus that it was rare in Sweden in his time; as he says, in the *Fauna Suecica*, 1746, "*Habitat in magnatum prædiis rarius*;" and in the last edition it is altogether omitted.

It may be proper here to make a few remarks on the character of the Ass, and its nearest congeners, as compared with those of the Horse, upon which it has been thought necessary to establish them as distinct genera in the family. It is true that in the absence of any knowledge of the original condition of the Horse, the question can only be considered with reference to the characters of a domesticated and probably much-altered race; but as the distinctions upon which the division in question is founded are structural, there is less danger of error than if they had been only those of colour or of general form.

The character of the tail is one of the most striking points upon which this distinction rests. In the Horse, the whole of this part is covered with long hair, totally concealing its actual form; whilst in the whole of the others, the Ass, the Zebra, the Quagga, the Dzigtai, &c. it is only clothed with long hair towards the extremity. The mane of the Horse also is long and flowing: that of all the other species is short and upright. In the former animal, the hinder as well as the fore legs are furnished with those warty callosities, which in the others, without exception, are found only on the fore legs. Waving some other particulars of minor importance, there is one character which, if not in itself to be considered as of primary value, is yet interesting, and not unimportant as a collateral distinction: I mean the general tendency of the coloration and marking

in the two forms. In the Horse's coat there is an obvious disposition to the formation of small round spots of a different shade or hue from that of the ground,—and this is the case whether the general colour be black, chestnut, or grey: in the genus *Asinus*, on the contrary, the markings are invariably disposed in stripes. The Zebra, the Quagga, and the Mountain Zebra are examples too familiar to require more than this allusion; and in the Common Ass, not only is the same tendency evinced by the cross mark on the shoulders, but in the young Ass there are frequently observed some obscure darkish bands on the legs. These tendencies to a peculiar character of coloration and marking are well worthy of especial notice in the Mammalia, among which will be found numerous instances bearing upon the distinction of approximating forms. In birds and insects it is still more general and striking, and has always attracted the attention of naturalists; but in the present class it has certainly been too much overlooked.



PACHYDERMATA.

EQUIDÆ.



THE MULE.

THE question, how far the power possessed by two animals of producing young on the one hand, or fertile young on the other, bears upon the generic or specific identity of the parents, is one of the greatest interest in the investigation of zoological relations. It has been supposed, and with very considerable probability, that the production of male and female progeny which are fertile *inter se*, is to be considered as in itself a positive proof that the parents are of the same species, how much soever they may differ in external form and appearance. It is well known that there are many instances of animals, undoubtedly distinct, producing young, which become fertile in conjunction with one or other of the parent kinds. This has been proved in the case of several species both of gallinaceous and natatorial birds, in a domesticated state; but there is not, I believe, on

record, a single instance of a male and female of such hybrid progeny being mutually fertile. On the other hand, the production of sterile hybrids between distinct species of the same group, is a circumstance so commonly occurring, as to require only an allusion; and a reference to the present animal is a sufficient illustration of the fact. But the power of reproduction even of such progeny is considered by some as indicative of a generic relation between the parent species, and has been urged as an argument against the separation of the Horse as a distinct genus from the Ass and its congeners. Before this observation, however, can be allowed to have any weight, it rests with the objectors to define the precise meaning and limits of a *genus*; and until this has been done, which has never yet been satisfactorily attempted, such an argument is a mere begging of the question. The Mule has been known occasionally to produce young with the Horse or the Ass:* these cases are, however, extremely rare, and serve as illustrations of the statements which I have already made, as there is no instance on record of two Mules having bred together.*

The Mule, strictly speaking, is the progeny of the male Ass and the Mare, and is much more esteemed than the Hinny, by which name the offspring of the Horse and the female Ass is designated. It is a most valuable beast of burden in mountainous countries, from the unequalled sureness of its tread, as well as its great patience and endurance of fatigue, in which it probably surpasses every other domesticated animal. The Asses which are reared and selected for the breeding of Mules in Spain and other countries in

* The following fact must doubtless be placed to the account of this power of reproducing in the Mule. A small Mare was placed in a paddock in the Zoological Society's Gardens, in company with a male white Ass, and a male hybrid between the Zebra and the Ass. She had a foal which was distinctly marked with black stripes across the legs.

which they are extensively employed, are always of the finest breed, and could scarcely be recognized as of the same race with the poor stunted ill-used drudges of our heaths and commons. The progeny are of a corresponding degree of excellence, and are often equal to seven or eight hundred pounds burden, and stand as much as sixteen hands high. They are ordinarily employed in droves, walking with great regularity in a single line, the leader being furnished with a bell, which appears to excite and animate the whole drove.

The word Mule is doubtless derived from *μῶλος*, labour; from whence the Latin *Mulus*, which affords the Italian *Mulo*, the French *Mulet*, and our *Mule*. It was formerly called *Moyle* and *Moil*; and this word is still employed both in the southern counties of England and in Scotland to signify labour. Thus Burns in his exquisite "Cotter's Saturday Night:"

"The toil-worn cotter frae his labour goes;
This night his weekly *moil* is at an end."

Mr. Yarrell informs me that in Cornwall the word *moyle* signifies "barren:" this is a very remarkable coincidence, and after all, this may probably be the etymology of the last-mentioned name of our animal.

The Horse and the Ass will breed also with the Zebra or the Quagga; and there are at the present time a pair of Mules between the former animal and the Ass, belonging to the Zoological Society, which are constantly employed in drawing a light cart laden with provision, &c. One of the most remarkable instances of this kind, however, is the celebrated case of a Mare belonging to the Earl of Morton, which indeed affects, in the most important manner, a point of great interest both to physiologists and to breeders of

animals. The point proved is, that the characters of the male parent of the mother's first progeny exert a marked influence on her subsequent young, whatever may be the peculiarities of the father of the latter. This truth has been already illustrated when treating both on the Dog and on the Hog, and it receives a remarkable and interesting confirmation from the present fact. The circumstances were as follows :—

The Earl of Morton being desirous of obtaining a breed between the Horse and the Quagga, selected a young Mare of seven-eighths Arabian blood, and a fine male of the latter species ; and the produce was a female hybrid. The same Mare had afterwards, first a Filly, and afterwards a Colt, by a fine black Arabian Horse. They both resembled the Quagga in the dark line along the back, the stripes across the forehead, and the bars across the legs : in the Filly the mane was short, stiff, and upright, like that of the Quagga ; in the Colt it was long, but so stiff as to arch upwards and hang clear of the sides of the neck : in other respects they were nearly pure Arabian, as might have been expected from fifteen-sixteenths Arabian blood.

By what means this mark is fixed upon the future offspring by a being with which it has no possible immediate connexion, whether by an indelible impression on the sensorium of the mother, or by any other mode of which we are at present wholly ignorant, is a question only to be decided by a series of the most careful experiments ; and it must be acknowledged that there is scarcely a subject in the whole range of physiological inquiry more deeply interesting. This is not indeed the place in which such a matter can be discussed : but it will not be deemed irrelevant even to the object of this work, to entreat the attention of those who have it in their power to clear up so important and obscure

a question, to the means by which it may be best effected, and which will at once strike every one interested in physiological investigations. That the influence of mental impressions is sufficient, in numerous cases, to account for peculiarities in the offspring of many animals, we have facts enough to render at least very probable; but it is only by numerous well-directed experiments that it can be brought to a satisfactory and certain conclusion.



RUMINANTIA.

CERVIDÆ.

Genus, *Cervus*.

DEER.

Generic Character.—Horns bony and solid, deciduous ; branched or palmated. Teats four.

RED DEER.

Male, STAG, HART. Fem. HIND.

Cervus elaphus. Linn.

Specific Character.—Canine teeth in the male only : horns round ; antlers numerous, three of them turned forward : lachrymal furrow distinct ; colour reddish brown, the rump pale.

Cervus elaphus, LINN. Syst. Nat. I. p. 93. MULL. Zool. Dan. Prod. p. 5, sp. 35. ERXLEB. Syst. p. 301, sp. 3. DESMAR. Mammal. p. 434, sp. 666. FLEM. Brit. An. p. 26. JENYNS, Brit. Vert. p. 37.

Cervf, Biche, BUFFON, Hist. Nat. VI. p. 63, t. ix. x.

Stag, or Red Deer, PENN. Brit. Zool. I. p. 41. SHAW, Gen. Zool. II. p. 276, t. clxxvii.

THE genus *Cervus* of Linnæus, constituting the family *Cervidæ* of modern authors, is as well marked and as dis-

tinctly circumscribed a group as is perhaps to be found in the whole of the mammiferous class. The single character of deciduous osseous horns, without any corneous covering, is at once so tangible and so important, as to leave no doubt as to the relation of any one species of the whole group. The hollow persistent horns covering the bony nucleus which characterise the Bovine and Antilopine families, and the short persistent bony processes of the Camelopards, offer no instance of an intermediate or approximating structure; and the examination of a male individual of sufficient age will therefore at once enable us to refer it to its proper station.

There are, however, several minor characters in which the species differ amongst each other in the structure of these arms, and of other parts, which have led modern naturalists to separate the family into several distinct groups or genera;—a task which has been performed by Colonel Hamilton Smith with much acumen and great knowledge of the subject. Mr. Swainson has followed the same general arrangement; and I should have been disposed to divide them into similar groups, affixing to them distinct names, but for the consideration that in so few as three species, which are indeed the representatives of as many genera, it would rather confuse than assist the British zoologist, by the introduction of distinctions, the value of which can only be rightly understood by the collation of a greater number of the different forms. Referring therefore the zoologist to the elaborate treatise of Colonel Smith on the *Ruminantia*, contained in Griffith's Animal Kingdom, I content myself with including in one generic character the three species which are indigenous to Britain.

That the horns of these animals are intimately connected with sex, is proved by every circumstance of their growth and economy. With the exception of the Rein Deer, the

female does not possess horns ; and the annual falling of the horns takes place immediately after pairing-time. There are other circumstances, the result of experiment, which show this fact in a very remarkable point of view, but which cannot be detailed in this work.

This annual shedding and growth of the horns is a very curious and interesting subject of investigation : but previous to tracing the steps of this curious process, it is necessary to describe the different parts of which the horn is composed. It is placed upon a protuberance on each side of the frontal bone : the part which rests upon the bone, forming the base of the horn, is surrounded by a rough protuberant ring, called the *burr* ; the principal stem of the horn has the name of the *beam* ; the irregular divisions near its extremity are termed *branches*, and are distinguished from the true *antlers*, which are the essential branches belonging to the species, and stand generally forwards, of which the first is called the *brow-antler*, the next the *bez-antler*, and the third the *royal* : the crown is termed the *surroyal*. By the number of these antlers, and other marks in the development of the horns, the age of the animal may be nearly ascertained. The growth of the horns is an astonishing instance of the rapidity of the production of bone under particular circumstances, and is certainly unparalleled in its extent in so short a period of time. A full-grown Stag's horn probably weighs twenty-four pounds ; and the whole of this immense mass of true bone is produced in about ten weeks. During its growth the branches of the external carotid arteries, which perform the office of secreting this new bone, are considerably enlarged, for the purpose of conveying so large a supply of blood as is necessary for this rapid formation. These vessels extend over the whole surface of the

horn as it grows, and the horn itself is at first soft and extremely vascular, so that a slight injury, and even merely pricking it, produces a flow of blood from the wound. It is also protected at this time with a soft, short hairy or downy coat, which is termed the velvet; and hence the horns are said to be in the velvet during their growth. When completed, the substance of the horns becomes dense, the arteries become obliterated, the "velvet" dries and falls off in shreds; a process which is hastened by the animal rubbing his horns against the branches of a tree. The horns remain solid and hard, constituting the most effectual weapons of defence; and they are often used during the pairing-season in violent and sometimes fatal combats between the males. After this season is over, absorption takes place at the point where the horn joins the boss or frontal process, and at length falls off, to be renewed again in due time. Such is a brief and general description of this remarkable process in the Deer generally: the periods at which it takes place vary in the different species, and will be alluded to hereafter under each subject.

The three species which now inhabit this country belong to as many separate groups of the family. The Stag is the representative of the *Elaphine* group of Smith; the Fallow Deer, that of the *Platycerine*; and the Roe, that of the *Cu-preoline*. In ancient times the forests and morasses of Ireland were the habitation of a very large species, called erroneously the Irish Elk: it is, properly speaking, more nearly allied to the Fallow Deer, being a species of the same group, as is testified by its fossil remains, which are frequently dug up in the peat-bogs of Ireland. Some of these indicate that the animal was of great size, probably much larger than the Wapiti; and the horns are enormous. One pair which

ornaments the museum of my friend Mr. Mantell extends thirteen feet from tip to tip ; each horn being six feet in length, and nearly a foot asunder across the forehead.

The Stag or Red Deer is by far the largest of the existing British species. In England it now rarely occurs in a wild state ; but in many parts of Scotland it still exists in considerable numbers ; and a Stag-hunt is even in the present day the scene of much of the excitement and profuse hospitality by which this noble sport was characterised in days of yore : though the multitudinous gatherings of the clans upon this pretext were found to be so often made subservient to political purposes, that it was thought necessary to abolish them by act of parliament. I have seen a few Red Deer in the New Forest within the last ten years, though I believe they now exist there in very small numbers : there are said to be some in Gloucestershire, and in a few other parts of the southern districts of the kingdom. As lately as in the reign of Queen Anne, as White informs us in his *Natural History of Selborne*, the Red Deer were very abundant in Woolmer Forest in Hampshire ; that queen having been treated with a sight of the whole herd, brought by the keepers along the vale before her, amounting to about five hundred head. It is within the recollection of some of my friends that a few still existed in Epping Forest ; but they have now been extinct there for many years. The Royal Stags are mostly kept in a small park at Windsor, for the purpose of being hunted by the King's Stag-hounds. It is in the central Grampians about Athol, however, that they are principally found, congregating in herds of four or five hundred ; and they are here, I believe, the property of the noble duke of that title. It is an ancient denizen of the forests of this country. From the most remote periods, it has been the favourite object of the chase ; and the severe forest-laws of our earlier Norman

monarchs sufficiently attest the importance which they attached to the sport. The afforesting of vast tracts of country, by which not only single cottages were destroyed, but whole villages swept away, and churches desecrated and demolished, was the fertile source of misery to the poorer inhabitants, and of injustice to the ancient proprietors of the soil; and the cruel inflictions of the oppressive laws which were enacted to preserve the Deer, increased tenfold the curse arising from this tyrannical passion for the chase,—for it was a crime less severely penal to kill a man than to destroy or take a Deer.

The ancient customs and laws of “Venerie,”* that noble science, which our simple ancestors looked upon as one of the first accomplishments of the high-bred noble, and a knowledge of which was essential to his education, were formal and technical to a most absurd and ludicrous degree. A few of the terms, betokening the different ages of the Stag and Hind, are still retained, though somewhat altered. The young of either sex is called a *Calf*; after a few months the male becomes distinguished by the growth of the bossets, or frontal protuberances, on which the horns are afterwards developed, which during the first year are merely rounded knobs, from whence he takes the name of *Knobber*. In the second year they are longer and pointed, and are called dags, and the animal has now the name of *Brocket*. In the third year, the first, or *brow antler*, has made its appearance, and the Deer becomes a *Spayad*. In the fourth, the *bez-antler* is added, and he is then termed a *Staggard*. He is a *Stag* in the fifth year, when the third antler, or *royal*, appears: and in the sixth, the commencement of the *surroyal*, or crown,

* “Beasts of the forrest” were divided into “beasts of venerie and beasts of chase.” The former, according to old Guillim, were the “Hart, Hynde, Hare, Boare, and Wolfe:” consequently the “Bucke, Roe, Foxe, Martern, and Conie,” were beasts of chase.

is formed ; when he takes the name of *Hart*, which name he retains through life. At this time he is called a *Hart* or *Stag* of ten,—probably because the branches, including the surroyal, frequently amount to that number. After the seventh year he is said to be *croched*, or *palmed*, or *crowned*, according to the number of branches composing the surroyal.



The female is a *Calf* in the first year, a *Brocket's sister* in the second, and in the third, and ever afterwards, a *Hind*.

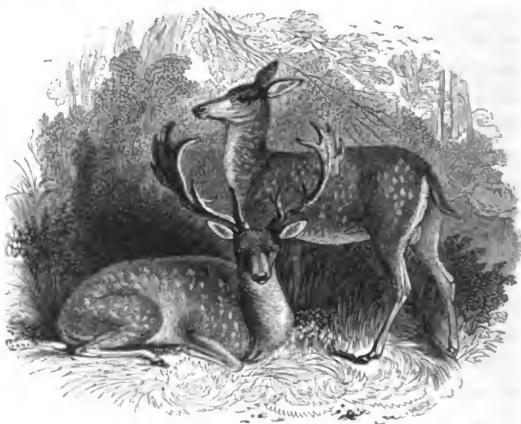
I cannot better explain a few other terms of this “ancient and honourable science” than in the words of Guillim, who, in his *Display of Heraldrie*, has treated this subject with all the humorous solemnity and racy simplicity which so well become him, and which cast such a charm over the whole of his curious and amusing book. “Whereas some men are of opinion that a *Stagge*, of what age soever he be, shall not be called a *Hart* untill the *King* or *Queene* have hunted him ; that is not so : for after the fift yeare of his age, you shall no more call him a *Stagge*, but a *Hart*. So then at sixe yeares old he is called a *Hart*. Now if the *King* or *Queene* doe chase or hunt him, and hee escape away alive, then after such hunting or chasing he is called a *Hart Royall*.

“Note, that if this *Hart* be by the *King* or *Queene* so hunted or chased, that he be forced out of the forrest so farre

that it is unlike he will of himselfe returne thitherto againe, and then the King or Queene giveth him over, either for that he is weary, or because he cannot recover him ; for that such a *Hart* hath shewed the *King* pastime for his delight, and is also, as *Budæus* noteth, *eximius Cervus*, a goodly *Hart*, and for that the *King* would have him returne to the *forrest* againe ; he causeth open *proclamation* to be made in all townes and villages neare to the place where the same *Hart* so remaineth, That no manner of person or persons shall kill, hurt, hunt, or chase him ; but that hee may safely returne to the *forrest* againe from whence he came. And then ever after such a *Hart* is called a *Hart Royall Proclaymed*."

The pairing season is in August, and it continues about three weeks. During this period the Harts are in a state of extreme excitement, and fight furiously when two of the same age and similar strength happen to meet. The Hind goes with young eight months and a few days, and seldom produces more than one Calf. The Hinds then retire from the herd to bring forth, and continue to attend their young with the greatest assiduity and tenderness: these remain with their dams during the summer, and in the winter the whole herd becomes completely gregarious. About February the males lose their horns, and they begin to be renewed shortly afterwards. At this period, and for some time subsequently, they retire from the herd and remain apart.

A fine Stag stands about four feet, or even more. His colour is reddish brown in the summer, the rump pale ; in winter, brownish grey. The eyes are large and full, and there is a distinct lachrymal furrow. The hind is usually smaller than the Stag. The Calf is commonly spotted with white, or *menilled*, as it is termed, on the back and sides.



FALLOW DEER.

Male, BUCK. Fem. DOE. Young, FAWN.

Cervus dama. Linn.

Specific Character.—Horns divergent; the upper part flattened and palmate; the beam round, with two antlers standing forwards: no canine teeth; a muzzle, and distinct lachrymal fossæ.

- Cervus dama*, LINN. Syst. Nat. I. p. 93. MULLER, Zool. Dan. Prod. p. 6, sp. 37. ERXLEN. Syst. p. 309. DESMAR. Mammal. p. 438, sp. 672. FLEM. Brit. An. p. 26. JENYNS, Brit. Vert. p. 38.
- „ *platyceros*, RAY, Syn. Quad. p. 85.
- Dama vulgaris*, GESNER, p. 335, fig. p. 1100.
- Daim et Daine*, BUFFON, Hist. Nat. VI. p. 167, t. xxvii. xxviii. FR. CUV. Dict. des Sc. Nat. VII. p. 471.
- Fallow Deer*, PENN. Brit. Zool. I. p. 41. SHAW, Gen. Zool. II. p. 282, t. clxxviii. clxxix.

THIS beautiful species, the type of the Flat-horned or Platycerine group of Deer, is well known as the common

denizen of the parks, the chaces, and the forests of England. Whether it may be considered as indigenous to this country, or whether introduced at some remote period, appears to be a question which the lapse of time and the absence of sufficient historical testimony render difficult if not impossible of solution, and one upon which the most diligent search which I have been able to make has not thrown the smallest light. The circumstances which lead to the latter opinion, are its restriction, in this country, solely to places which have been set apart for its reception, and the strong evidence which exists, both from the known foreign habitats of the species, and from its comparative intolerance of our winters, that it must have been originally transplanted from a more genial climate. In this respect its habits differ essentially from those of the hardy Stag and Roe-buck, which brave the cold of even Scottish winters, and live and flourish through them without the care and tendance of man. It is probable that it was brought to this country from the South of Europe, or from the Western parts of Asia, in which places it is found to attain to a larger size than in its semi-domesticated state in our parks. It is found, indeed, in a more severe climate than our own ; but it is only the dark brown variety, which is far more hardy than the usual one, and is well known to have been imported on account of this quality by James the First from Norway.

Like the Stag, the Buck casts his horns in the spring, but about two weeks later than the former animal. The period of gestation in the Doe is eight months : she brings forth generally one, not unfrequently two, and sometimes three Fawns at a birth ; conceals them, as does the Hind, though somewhat less carefully. The young male, unlike that of the Stag, does not exhibit the commencement of the horns until the second year, when they make their appearance as

simple snags, and the animal is called a *Pricket*. In the third, two branches are produced, and the top of the beam becomes palmate. The fourth year finds them still more developed, and the palmate part deeply indented or incised. In the fifth year, when he acquires the name of a *Buck of the first head*, the horns have acquired nearly their full development ; but in the sixth, some additional snags are added to the flattened part of the beam, which are called *spillers* or *advancers*, and the palmate portion has become very broad. The process of acquiring and of shedding the horns is precisely similar to that which takes place in the Stag, but not only is their form different, but the excrescences and furrows are less distinctly marked. The engraving gives a representation of a horn from the second to the sixth year inclusive.



Fallow Deer are gregarious to a great extent, associating in large herds, the Bucks apart from the Does, excepting during the pairing season, and in the winter, during which season they associate promiscuously. They are much more familiar with man than are the Red Deer, being easily rendered perfectly tame. Most persons who have often visited Greenwich Park, must have seen them approach parties who have been taking refreshment on the grass, and, in the boldest and most familiar manner, intrude upon them for a biscuit or an apple, which is seldom refused. The following anecdote is quoted from Playford's Introduction to Music:

“ Travelling some years since, I met on the road near Royston a herd of about twenty [Bucks], following a bagpipe and violin, which while the music played, went forward ; when it ceased, they all stood still : and in this manner they were brought out of Yorkshire to Hampton Court.” A fondness for musical sounds is not confined to this animal : there is more than poetical truth in the power of the lyre of Orpheus over the beasts of the field ; and Shakspeare avails himself of this predilection in cattle, to form one of his exquisite illustrations. I have often, when a boy, tried the effect of the flute on Cows and some other animals, and have always observed that it produced great apparent enjoyment.

There are two varieties of the Fallow Deer commonly met with in this country ; though, from their having long intermixed, the characters do not now remain so generally distinct as was formerly the case. The common or original colour is a reddish brown, spotted with white, as represented in the engraving ; the other is a dark brown, approaching sometimes to a blackish brown, and almost uniform over the whole body. The latter variety was imported from Norway by James the First, on account of its greater hardiness and endurance of cold.

The venison of this species is considered as very superior to that of the Red Deer, which is generally coarse and tough, and with but little flavour. Sometimes, however, a fine haunch of the latter, in high season, is said to be but little inferior to the former. The skin both of the Buck and Doe is well known as affording a kind of leather at once soft and durable. The horns, like those of the Stag, are manufactured into the handles of knives, and other cutlers' instruments ; and the refuse has always been employed in the manufacture of ammonia, from whence the common name of hartshorn.

The word *fallow* describes the prevailing colour of the animal ; Anglo-Saxon *Fealewe*, which Somner derives from *helvus*, *gilvus*. Thus, in the earlier writers, to *fallow* signifies to grow pale, to fade. *Buck* is probably from *bocker*, to strike, and is therefore an animal that strikes with the horns ; and thence it has become the general name of the male of the beasts of chase, even of those which have no horns, as the Hare and the Rabbit. *Doe* is the Anglo-Saxon *Da* ; and *Fawn*, from the French *Fan*, *Faon*, which, say some, is derived from the Latin *Infans*.

The Buck usually stands about three feet, or rather less, to the top of the shoulder, and is about five feet in total length : the tail is seven inches and a half nearly.

The gigantic Deer, the remains of which have been found in various parts of England, and especially of Ireland, belongs to the same group of the family as the present species, though it has been erroneously called the Irish Elk. It stood more than six feet high, and was nine feet long, judging from specimens of which the greater part of the bones have been discovered ; but there is no doubt that the individual to which the horns in the possession of Mr. Mantel belonged, and to which I have before alluded, must have been still larger.

RUMINANTIA.

CERVIDÆ.



ROE DEER.

ROEBUCK.

Cervus capreolus. Linn.

Specific Character.—Horns small, rising perpendicularly from the head; the first antler standing forwards; another, higher up, directed backwards: no canine teeth; no lachrymal fossæ; muzzle naked; tail extremely short.

Cervus capreolus, LINN. Syst. Nat. I. p. 94. 6. MULL. Zool. Dan. p. 6. 38.
 ERXLEB. Syst. p. 313. 7. DESMAR, Mammal. p. 439,
 sp. 674. FLEM. Brit. An. p. 26. JENYNS, Brit. Vert.
 p. 38.

Chevreuil et Chevette, BUFFON, Hist. Nat. VI. p. 198, t. xxxii. xxxiii.

Roe, Roebuck, PENNANT, Brit. Quad. I. p. 49, t. iv. SHAW, Gen. Zool.
 II. p. 291.

THE Capreoline Deer, of which group this species forms a very characteristic type, are distinguished by their predilection for mountainous localities, as the Fallow Deer delights

in wooded plains, and the Stag in the most extensive forests. The Roebuck, of much smaller size than either of our other indigenous Deer, exhibits a degree of boldness and agility in its leaps, which fit it for its favourite haunts, and almost claim for it the analogical appellation of the Chamois of the Cervine family. It differs remarkably in many of its habits from the two species which have been described: its small size and great lightness of figure and limb, and its short and simple horns, do not more distinguish it from its British congeners, than do its instincts and affections. Instead of that promiscuous association of the sexes during a short season, which is the habit of the other species, the Roebuck is said to have his chosen companion for life, being strictly monogamous, and evincing the most lively regard and affection for his mate. The female, according to the statement of many authorities, brings two young ones at a birth, which are male and female, and which, after having been tenderly cared for by the parents for the due time, on leaving them, attach themselves to each other, and are never after separated. Such is the account ordinarily given of the species, and, if true, it is a circumstance of which I know no parallel in the Mammalia. The analagous instance of many of the *Columbidæ*, or pigeons, will occur to every one; but the turtle-dove has no longer the exclusive claim to be considered as the honoured emblem of the virtue of conjugal constancy. It is, however, probable that the pairing often takes place between individuals of different parentage, as Mr. Tytler of Edinburgh informs me that "they have usually one, not unfrequently two Fawns."

The pairing season is in November. The young are then driven from the parents, and do not rejoin them until they are nearly full-grown. The Doe goes with young five months: she brings forth her young, therefore, in the early

spring, and, like the rest of the family, conceals them from danger with great care and courage. She retires to the deepest cover to drop her Fawns ; but in about a fortnight comes abroad again, bringing them with her. The Fawn has no horns during the first year ; in the second, they spring in the form of mere prickets, or simple snags : the third year sees the addition of the first antler, which stands forwards ; in the fourth year a second antler is produced, which stands directly backwards ; and in the sixth year the horns have attained their full development. The engraving shows the annual change of the horns from the second to the sixth year inclusive.



The Roebuck is now rarely met with in England ; though it still abounds in many parts of Scotland. " They are not frequently met with," says Mr. Tytler, in a letter with which he has lately favoured me, " in larger numbers than two or three at a time ; but we find their couches among the heather, as if a larger party, perhaps six or seven, had lain together. They scrape off the heather, and make a form like Hares, which they also resemble in keeping to the same tracks, and in stopping frequently, if a sudden, not very loud noise is heard. The Roe seems to be extremely cautious ; and they make use of their fine sense of smelling, as well as hearing, to warn them of an enemy. They will scent a man a long way off, and hold their noses in the air, like a Pointer drawing on his game. A usual way of deceiving them is, to hold a lighted peat in the hand, while approaching or lying in wait

for them, as the animals are accustomed to this smell, and less guarded in coming towards the spot. Their cry is like the baa of a Sheep, but more concentrated, so as to sound somewhat like a bark : at night especially, and in still moon-light, the cry may be heard to a great distance, and they are constantly answering each other through nearly a whole night.

“ The Roe,” continues Mr. Tytler, “ is never known to turn on its enemy when wounded ; but bad wounds are sometimes received from its horns while it lies tossing its head in agony. It is very active ; and I have seen one bound, without much apparent effort, across a road nearly twenty feet wide. Their usual pace, unless when hard pressed, is a long, rather awkward canter ; but when closely hunted or suddenly startled, their bounds are the most rapid and beautiful that can be conceived. They often come down on the corn-fields and peas in the neighbourhood of their haunts, feeding entirely in the grey of the morning and evening. The usual method of killing them is to drive the wood with Hounds and beaters, the shooters being placed so as to command the tracks or passes ; and caution is necessary to avoid the windward side, as the Roe will not approach if it smell the enemy. This sport is very tiresome ; and a much more exciting mode is, to walk quietly through their haunts in the earliest dawn, and endeavour to get within shot of them ; which, however, is by no means easily effected.” The venison of the Roe is not esteemed ; and there is scarcely any fat on the external parts of the body, even when in high condition.

The colour varies considerably. In some the general tint is reddish brown ; in others, brownish grey ; and in others, dusky : the under parts and inside of the thighs, greyish white ; the part around the tail, pure white. The tail is very

short, concealed within the hair. The ears are proportionally long, and the inner surface furnished with long whitish hairs; the nose brown; a white spot on each side of the lips; chin white: horns very rough, longitudinally furrowed, having two antlers; the first, about one third from the base, directed forwards; the second, higher up, having an opposite direction.

Dimensions :—

						Ft.	In.	Lines.
Length of the head and body	.	.	.	.	.	3	9	0
„ of the horns	.	.	.	.	.	0	8	6
„ of the tail	.	.	.	.	.	0	1	0
Height (forwards)	.	.	.	.	.	2	3	0
„ (behind)	.	.	.	.	.	2	7	0



RUMINANTIA.

BOVIDÆ.

Genus, *Bos*.

Generic Character.—Horns persistent, hollow, growing on a bony core ; body thick and heavy ; tail long, terminated by a tuft of hair ; four inguinal mammae.

THE OX.

Male, BULL. Fem. cow. Young, CALF.

Bos taurus. Linn.

Specific Character.—Forehead flat, longer than broad ; horns smooth and round, taking their origin from the extremities of the frontal ridge.

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| <i>Bos taurus</i> , | LINN. Syst. Nat. I. p. 98. MULL. Zool. Dan. Prod. p. 6. 41. DESMAR. Mammal. p. 499, sp. 748. FLEM. Brit. An. p. 24. HAMILTON SMITH in GRIFF. An. Kingd. IV. p. 418. JENYNS, Brit. Vert. p. 36. |
| <i>Bos urus</i> , | GRIFF. An. Kingd. V. p. 376, sp. 898. |
| <i>Urus Scoticus</i> , | HAMILTON SMITH, l. c. p. 417. |
| <i>Bos Scoticus et taurus</i> , | SWAINSON, Quad. p. 285. |
| <i>Bœuf</i> , | BUFFON, Hist. Nat. IV. p. 437, t. xiv. |
| <i>Ox</i> , | PENN. Brit. Zool. I. p. 18, t. ii. SHAW, Gen. Zool. II. p. 397, t. ceviii. |

OF all the animals which have been reduced into the immediate service of man, the Ox is without exception that to which he is most indebted for the variety and extent of its means of usefulness. If the qualities of the Dog are of a higher and more intellectual character, and bring it into closer communication with man as a social being ; and if the Horse, as a beast of burden and of draught, serve more to his immediate personal assistance ; the Ox surpasses these and all others in the devotion of its powers while living, and the appropriation of every part of the body when dead, to the wants, the

comforts, and the luxuries of his owner. This universal utility of the animal appears to have been very soon detected, and we find consequently that its domestication constituted one of the earliest triumphs of human authority over the natural instincts and habits of the brute creation. That this event took place before the Flood, and induced even then that propensity to a pastoral life which has ever been characteristic of man in his less cultivated state, wherever the climate was such as to encourage or permit it, we have the Sacred Writings to attest ; for we are told that Jubal, the son of Lamech, was the father or ancestor “ of such as live in tents, and of such as have cattle.” From the time when the family of Noah issued from the Ark, in every quarter of the earth which his varied and multitudinous descendants have cultivated, the Ox has been reared as the most useful and important aid to the necessities of mankind. In Egypt it was the object of worship ; and after the Israelites had left that seat of idolatry, when they themselves were disposed to lapse into that high and rebellious offence against the Majesty of Heaven, it was in the form of a golden Calf that they modelled the object of their absurd and impious rites.*

Whether the Ox exist now, or have existed within the range of sound historical testimony, in its original state,—or whether, as in the case of the Horse, all the instances of the occurrence of wild Oxen of this species now on record have not been derived from the domestic race fortuitously escaped from servitude and become wild,—is a question which it is difficult, if not impossible, satisfactorily to solve.

The ancient accounts of the *Urus*, or Wild Ox, declare it to have been an animal of enormous size and great fierceness ;

* For a short though very interesting and learned dissertation upon the mythology and ancient history of the Ox, I refer to Colonel Hamilton Smith's account of the Ruminantia, in *Griff. An. Kingd.* vol. iv. p. 411.

and the horns are described as being large, spreading, and acute. In this country, and in many parts of the Continent, have occurred numerous fossil bones of Oxen, with large horns having the form and direction of those of certain breeds only of our present cattle, particularly of such as are most wild; as, for instance, the celebrated wild white Oxen of Craven, of Chillingham Park, and of Scotland—the *Bos Scoticus* of some authors. I cannot but consider it as extremely probable that these fossil remains belonged to the original wild condition of our domestic Ox; an opinion which Cuvier appears to have entertained, who calls the skulls, “crânes semblables à ceux d’un bœuf domestique.” They are found only in very recent deposits, frequently in caverns mingled with the remains of various other animals; as in the celebrated Cave of Kirkdale, in different parts of Cornwall and of Devonshire. I have several teeth and some fragments of bones from Kent’s Hole in the latter county, where they were found in the same mass with the remains of the Elephant, the Rhinoceros, the Deer, the Bear, and the Hyæna. Cuvier, however, considers that they existed after the destruction of the latter species.

It has, indeed, been attempted to prove that the ancient remains alluded to, together with the Chillingham and Scottish breed, belong to a distinct specific type from the common domestic Ox; and some modifications of structure have been cited in proof of this opinion. It does not appear to me, however, that these modifications are of sufficient value to constitute specific distinction, as they appertain only to parts which are very variable in particular breeds of the domestic cattle: they are some slight differences in the form and direction of the horns, and the existence, in *old Bulls*, of a short rudimentary mane, and some hair upon the breast. Now there is certainly no point of sufficient import-

ance to form a specific distinction, even were the form of the horns less variable than they are in our domestic Oxen. We require yet a series of well-authenticated and well-directed experiments on the intermixture of the Scottish or Chillingham cattle with the domestic breeds, and the fertile or infertile character of the progeny ; which, if the views I have so repeatedly advanced on this subject be correct, would at once decide the question. Even Colonel Smith himself, a high authority in these matters, although he urges the specific distinction of the two animals, says “ the character of the domestic Oxen is absolutely the same as the fossil, and the wild breeds differ only in the flexure of the horns and external appearance, occasioned by the variations of climate, food, and treatment.” But it may be asked, do variations of climate, food, and treatment produce specific distinctions ? And yet this distinction is, as I have just stated, held both by Colonel Smith and Mr. Swainson.

Upon the whole, I cannot but believe that the fossil bones belonged to the original stock of our domestic Ox, and that the wild white cattle, the *Bos Scoticus* and *Urus Scoticus* of the authors just named, approaches so near to it as to leave it a matter of doubt, *not* whether they all belong to the same species, but whether this breed be the actual remnant of that original stock, or the descendants of domesticated individuals, which have resumed in a great degree their wild character from having ceased through many generations to feel the effects of human domination.

To return, however, from this digression. It is not only as affording the most wholesome, the most delicious, and the most universal kind of animal food, that the Ox deserves the distinction we have claimed for it : it is highly valuable as a beast of burden and of draught in many countries, and in some it is commonly employed for riding. In this country

it is only in a few districts that it is reduced to labour ; but wherever this is done to any extent, its excellence is universally felt and acknowledged. It is used in ploughing, in drawing waggons, and in various other employments to which the Horse is generally devoted in other parts of the country. Its readiness of acclimation in every part of the world, and in almost every range of temperature, is one of the most obvious and prevalent causes of its extensive distribution and usefulness. In the northern and frozen parts of Europe, and under a tropical sun, the Ox is still found and cherished, and is applied in all, in a greater or less degree, to the purposes just mentioned. Then the Cow during her life provides us, in her copious and continued supply of milk, with one of the most nutritive and wholesome aliments. Thus useful when living, its death seems to make it even more extensively serviceable. The flesh, the various portions of the stomach, and other viscera, constitute the most important articles of food ; the intestines and the bladder are employed for different uses in domestic economy ; the horns are extensively used in manufacturing numerous articles of utility, ornament, or amusement ; the ears and hoofs furnish the important article of glue ; the bones form a strong manure, or they are carved into various implements, and are thus an excellent substitute for ivory,—or they yield by decomposition several essential articles in medicine, domestic economy, and the arts ; the hair is used in mortar ; the hide is tanned into a strong durable leather ; and, in short, there is not a part of this most useful animal's body which does not, living or dead, contribute to the advantage of mankind.

The common charge of stupidity urged against the patient and much-enduring Ox, is wholly unfounded ; or if true, is only so of those breeds or individuals with which no pains

have been taken to cultivate and improve their natural instincts. Scarcely can the Horse itself boast a higher degree of tractability, or of intelligence, than this animal when its powers are excited and educated. In proof of this, we need only refer to the faithful Backely of the Caffre tribes, whose services in the field or in war, as the keeper of his master's herds, his protector from robbers, or the fighter of his battles, render him an invaluable possession to those semibarbarous hordes. We need not, however, go so far from home for proofs of intelligence : the Devonshire Oxen, which are almost exclusively employed in the labours of husbandry, exhibit a high degree of docility, and other mental qualities, which admirably fit them for the performance of such services. There are many amusing anecdotes recorded of this animal, to which I beg to add the following, which was witnessed by a lady, a near relative of mine :—A Cow which was feeding tranquilly in a pasture, the gate of which was open to the road, was much annoyed by a mischievous boy, who amused himself by throwing stones at the peaceful animal ; who, after bearing with his impertinence for some time, at length went up to him, hooked the end of her horn into his clothes, and lifting him from the ground, carried him out of the field, and laid him down in the road : she then returned calmly to her pasture, leaving him quit for a severe fright and a torn garment.

The period of gestation of the Cow is nine months. One fact connected with this part of her natural history it is necessary to mention, as it is one of considerable physiological interest. It is well known that if the Cow produce twin Calves, one of each sex, the male is perfect, and the female barren ; which last is termed a Free Martin. This is so generally true, that there are not, I believe, more than two or three authentic instances of its fertility. For the

anatomical and physiological facts connected with this subject, I refer to the well-known papers of John Hunter on the Free Martin, in his work on the Animal Economy. The following etymology of the name is taken from the "Glossary of the Dialect of Craven in the West Riding of Yorkshire :"—"When a Cow produces two Calves, one a male and the other a female, the female is styled a *Free Martin*; which, it is said, never breeds. In Scotland, a Cow or an Ox which is fattened, is called a *Mart*. Hence, probably, the term originated. The female, not fit for breeding, was *free*, or at liberty for fattening." My friend Mr. Yarrell suggests that Free Martin may mean "free for the *mart*, or market."

Now and then a Cow produces three Calves. A very remarkable instance is recorded in the "Nouveau Bulletin des Sciences," of a Cow which brought nine Calves at three successive births: "four at the first, all females, in 1817; three at the second, of which two were females, in 1818; and two females in 1819;—all of which, with the exception of two of the first birth, were nursed by the mother."

The history of the Ox, in this country, commences with the account given by Cæsar of the state of the inhabitants of Britain when he invaded our island. From that account we gather that the cultivation of the soil for the growth of grain, and other similar productions, was almost wholly neglected; and that the Britons lived principally on milk and flesh. The pastoral life is well suited to the lazy and idle propensities of man in that early stage of civilisation, when his wants are few, and before the principles of willing labour and industry are developed by the stimulus of numerous and increasing objects of desire. This propensity is also fostered by the productiveness of the soil in comparison with the population at such early periods, and the freedom with

which they can lead their flocks and herds from pasture to pasture, without the infringement of the laws of trespass, or the invasion of another's property. Hence in all young States, with a thinly-scattered population, the Ox and the Sheep furnish to the inhabitants the readiest materials both of food and clothing. It would appear, however, that a brief intercourse with a nation so highly cultivated as the Romans led to the encouragement of husbandry; and the Ox, which had before supplied, immediately, the primitive wants of food and clothing, was now made subservient, by his bodily labour, to the cultivation of the soil.

Still the labours of agriculture were always principally performed by Horses; and it does not appear that any very decided steps were taken towards the improvement of the English breeds of cattle until within the last half century, or rather more. They were, it is true, bred in great numbers to supply the profuse hospitality of the ancient nobility; but there is no reason to believe that any particular care was taken to procure the best breeds, or to increase their size by a particular mode of feeding. The establishment of prizes has led, perhaps, as much as the real advantage of the pursuit, to that great interest which has of late years been taken in the breeding and fattening of cattle. The result has been the establishment of numerous distinct breeds, of which some are particularly advantageous for particular districts. Of these it will not be expected that, in a work like this, any detailed account should be given: I therefore content myself with a few very general observations on these matters, and refer, with great satisfaction, for a more extended account to the admirable book of Mr. Youatt, already mentioned,—a work which is equally commendable for the extent of information, the accuracy of judgment, and the kindness and humanity of disposition, by which it is characterised. I

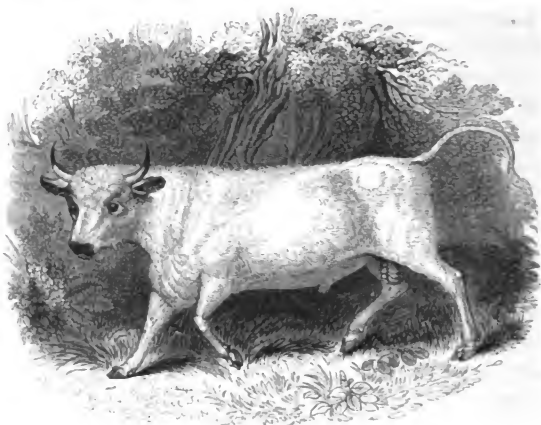
make no further apology for extracting from this work the following general observations as to the distribution of the principal breeds:—"The breeds of cattle as they are now found in Great Britain, are almost as various as the soil of the different districts, or the fancies of the breeders. They have, however, been very conveniently classed according to the comparative size of the horns: the long horns originally, so far as our country is concerned, from Lancashire, much improved by Mr. Bakewell of Leicestershire, and established through the greater part of the midland counties;—the short horns, originally from East York, improved in Durham, mostly cultivated in the northern counties and in Lincolnshire, and many of them found in every part of the kingdom where the farmer attends much to his dairy, or a large supply of milk is wanted;—and the middle horns, not derived from a mixture of the two preceding, but a distinct and valuable and beautiful breed, inhabiting principally the north of Devon, the east of Sussex, Herefordshire, Gloucestershire: and of diminished bulk, and with somewhat different character, the cattle of the Scottish and Welsh mountains. The Alderney, with her crumpled horn, is found on the southern coast, and, in smaller numbers, in gentlemen's parks and pleasure-grounds everywhere; while the polled or hornless cattle prevail in Suffolk and Norfolk, and in Galloway, whence they were first derived.

"These, however, have been intermingled in every possible way. They are found pure only in their native districts, or on the estates of some opulent and spirited individuals. Each county has its own mongrel breed, often difficult to be described, and not always to be traced,—neglected enough, yet suited to the soil and to the climate; and, among little farmers, maintaining their station, and advantageously maintaining it, in spite of attempts at supposed

improvements by the intermixture or substitution of foreign varieties."

In selecting the illustrations of this species, I have chosen the White Wild Chillingham Bull, as an example of the nearest approach to the original form ; the Shetland Bull, as exhibiting a considerable return towards the type, arising from want of care and tendance, and from being suffered to recover nearly its wild habits ; and the Devon Bull, and the Hereford Cow, as fair specimens of the modern improved breeds.





CHILLINGHAM WILD CATTLE.

Urus Scoticus. Ham. Smith.*Bos Scoticus.* Swainson.

THIS remarkable breed, to which allusion has already been made, is now found only in a few private parks. Formerly wild cattle were found in many of the forests and uncultivated districts, although we have no proof that they belonged to this remarkable breed. Fitz-Stephen, who wrote in the time of Henry the Second, informs us distinctly, that Wild Bulls, "*Tauri sylvestres*,"* formed one of the species of animals which inhabited the forest by which London was partially surrounded in his time; and the mention of their existence in the northern districts of England and south of Scotland is still more recent, as we find from Sibbald and other authors. In the History of Craven, it is stated that

* "Proximè patet foresta ingens, saltus nemorosi ferarum, latebræ cervorum, damarum, aprorum, et taurorum sylvestrium."—Fitz-Steph. Tract.

the Wild White Oxen formerly occupied the waste district in the neighbourhood of the park in which they are now kept ;* and there can be no doubt that the latter are the remains of that wild breed. Of the habits of these animals, several interesting accounts have been given ; and for a perfect representation of the Bull, I need only refer to the splendid picture by Edwin Landseer,—perhaps as perfect a representation of a recently dead animal as has ever appeared upon canvass, even from the pencil of this accomplished master. The following account, as it is the best which has appeared of the Chillingham cattle, I venture to give at length, though it has before been quoted. I have, however, to premise that there is one circumstance connected with the colour of these animals which is interesting, as being in all probability a true specific character : I mean that, although the whole of the body is of a pure creamy white, the ears and muzzle are always coloured ; the former part being red, and the latter black. I have been in the habit, ever since I was a boy, of examining every white specimen of cattle that has come within my observation, and I have never yet seen one that had not some colour about the ears, either red or black, according to the breed. I remember that my attention was first of all attracted to this peculiarity by having, when a schoolboy, seen a beautiful pure white Calf, belonging to the parent of one of my schoolfellows ; and finding that about half of the ears was red, it struck me that such might possibly be an invariable character, and so I have found it.—To proceed with the description of the Chillingham cattle :

“ Their colour,” says Mr. Culley, from whose observations on Live Stock this account is taken, “ is invariably of a creamy white, muzzle black ; the whole of the inside of the

* In the Manor of Gisburne, now in the possession of Lord Ribblesdale.

ear, and about one-third of the outside, from the tips downwards, red ; horns white, with black tips, very fine, and bent upwards ; some of the Bulls have a thin upright mane, about an inch and a half or two inches long. At the first appearance of any person, they set off in full gallop, and, at the distance of about two hundred yards, make a wheel round, and come boldly up again, tossing their heads in a menacing manner : on a sudden they make a full stop at the distance of forty or fifty yards, looking wildly at the object of their surprise : but upon the least motion being made, they all again turn round, and fly off with equal speed, but not to the same distance, forming a shorter circle, and again returning with a bolder and more threatening aspect than before ; they approach much nearer, probably within thirty yards, when they again make another stand, and then fly off : this they do several times, shortening their distance, and advancing nearer and nearer, till they come within such a short distance, that most people think it prudent to leave them, not choosing to provoke them further.

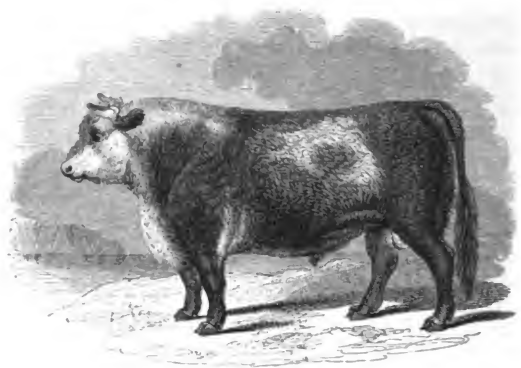
“ The mode of killing them was perhaps the only remains of the grandeur of ancient hunting :—On notice being given that a Wild Bull would be killed on a certain day, the inhabitants of the neighbourhood came mounted and armed with guns, &c. sometimes to the amount of a hundred horse, and four or five hundred foot, who stood upon walls, or got into trees, while the horsemen rode off the Bull from the rest of the herd until he stood at bay, when a marksman dismounted and shot. At some of these huntings twenty or thirty shots have been fired before he was subdued. On such occasions, the bleeding victim grew desperately furious, from the smarting of his wounds, and the shouts of savage joy that were echoing on every side. But, from the number of accidents that happened, this dangerous mode has not

been practised of late years ; the park-keeper alone generally shooting them with a rifle gun at one shot.

“ When the Cows calve, they hide their Calves for a week or ten days in some sequestered situation, and go and suckle them two or three times a day. If any person come near the Calves, they clap their heads close to the ground, and lie like a Hare in a form to hide themselves.”

The question of the claim of this breed to a near relation to the primitive type of the species has been already sufficiently discussed.





SHETLAND BULL.

It is impossible not to be struck at once with the remarkable aspect of this singular animal. The engraving is taken partly from the spirited figure, after Mr. Harvey's drawing, in the work of Mr. Youatt, and exhibits, in a very striking manner, that combination of characters which the unrestrained wildness of its habits and the coldness of the climate might be expected to produce. Stunted in its growth, but furnished with a large quantity of long rough hair, it presents a curious contrast to the pampered and high-bred Devon Bull which forms the next subject; and the strait prominent forehead, the short strait horns, and the enormous dewlap, bespeak their resumption of a portion of their original character. They are very small, being "rarely more than four feet high, and sometimes not more than thirty-five or forty pounds the quarter." It appears that trials have been made to introduce these cattle southward: in the north of Scotland they are found to thrive very rapidly; but further

south they do not bear the change, “ becoming sickly and even poor in the midst of abundance.” The beef is said to be of excellent quality ; and they yield a very small quantity of exceedingly rich milk.

But the most interesting circumstance attached to this breed is the obvious tendency which a relaxation of domestic discipline and management produces towards a return to the form of the original wild type ;—a fact which has been more particular insisted upon and illustrated in speaking of the relations between the Wolf and the different domestic Dogs.





THE NORTH DEVON BULL.

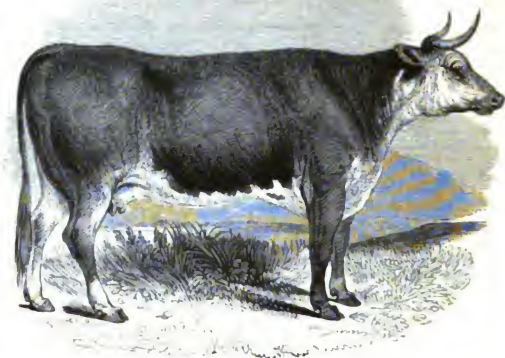
THE beautiful animal which forms the subject of the present figure, offers a very fair specimen of the high degree of perfection to which care and judicious breeding have brought this useful race. Retaining much of the noble and free bearing of the less cultivated breeds, there is still an evidence of good breeding and, if the expression may be employed, of *blood* about him, that cannot be mistaken. The figure is not to be considered as a complete portrait, for its principal points are derived from the beautiful figure by Harvey in Mr. Youatt's work, which appeared preferable to a servile copy of a specimen deficient in some striking and characteristic points.

The Ox of this noble breed may be considered as the very perfection of the working type of this animal. It is characterised by extraordinary docility and good temper, combined with great strength and perseverance in the performance of its labour, and a degree of activity possessed by no other

breed. Four good Devonshire Oxen, it is said, will do as much work as three Horses; and in returning with empty waggons in harvest, they will trot along up to six miles an hour. "There is a peculiarity," says Mr. Youatt, "in driving the Ox-team in Devonshire, which is very pleasing to the stranger, and the remembrance of which, connected with his early days, the native does not soon lose. A man and a boy attend each team; the boy chants that which can scarcely be regarded as any distinct tune, but which is a very pleasing succession of sounds, resembling the counter-tenor in the service of the cathedral. He sings away with unwearied lungs, as he trudges along almost from morning to night; while every now and then the ploughman, as he directs the movement of the team, puts in his lower notes, but in perfect concord. When the traveller stops in one of the Devonshire valleys, and hears this simple music from the drivers of the ploughs on the slope of the hill on either side, he experiences a pleasure which this operation of husbandry could scarcely be supposed capable of affording. This chanting is said to animate the Oxen somewhat in the same way as the musical bells that are so prevalent in the same country. Certainly the Oxen move along with an agility that would be scarcely expected from cattle; and the team may be watched a long while without one harsh word being heard, or the goad or the whip applied. The opponents of Ox-husbandry should visit the valleys of North or South Devon, to see what this animal is capable of performing, and how he performs it."^{*}

Thus superior in the labours of the field, the Devonshire cattle are perhaps not inferior to any in the quality of their flesh; and although they do not equal some others in their size or capability of fattening, they are even in this respect superior to many.

^{*} Youatt, l. c. p. 18.



THE HEREFORDSHIRE COW.

I HAVE selected this subject as the illustrative figure of the Cow, not on account of any great excellence which she possesses as a dairy breed, but because few others exhibit so much beauty of form, or so many fine points characteristic of the sex in cattle. The pleasant, almost amiable expression of the face, the open broad forehead, the lively full eye, the taper spreading horns, the small but elegantly-formed head, the roomy barrel, the deep well-spread carcass, the clear upright short legs, and neat bright silky hair, all of which have been described as belonging to this white-faced breed, form a combination of points as beautiful, perhaps, as those of any other race of cattle in the kingdom. This, however, it must be acknowledged, is the feeling rather of the lover of abstract beauty of form than of the practical economist ; for many other breeds are far preferred by the farmer and the grazier. Although, however, it is surpassed by

others in the quantity of milk which it yields, it fattens readily, and to a great weight, some Oxen having been known to reach ninety, a hundred, and even a hundred and ten score.

For the dairy, the Polled Suffolk Cow is superior to most others. In the height of the season, many of them will yield the enormous quantity of eight gallons of milk daily.

This rapid and imperfect allusion, for it professes to be no more, to a select number of the different breeds of our British cattle, is intended only to serve as a medium of partial illustration. An author who for many years has been far removed from the pleasant scenes and peaceful labours of a country life, and confined to the incessant daily routine of a sedentary profession, needs scarcely to apologise for the absence of personal experience on matters connected with rural economy, how keen soever may be his enjoyment of such scenes, or how deeply he may sigh for a return of those tranquil and healthful pleasures.

“*Quæ cura Bôum, qui cultus habendo
Sit pecori,*”

are matters on which he can have no original instruction to offer; and he best does his duty by referring his readers to those sources from which his own knowledge, whatever it may be, has been derived, and to which they may have recourse for the best practical and useful information.

RUMINANTIA.

CAPRIDÆ.

Genus, *Capra*.

GOAT.

Generic Character.—Horns hollow, persistent, rough, and angular ; directed upwards and backwards and outwards : chin bearded ; tail short ; mammæ two.

COMMON GOAT.

Capra hircus. Linn.

Specific Character.—Horns angular in front, rounded posteriorly.

- Capra hircus*, LINN. Syst. Nat. I. p. 94. MULL. Zool. Dan. Prod. p. 6, sp. 39. ERXLEB. Syst. p. 256, sp. 1. FLEM. Brit. An. p. 25. JENYNS, Brit. Vert. p. 37.
 „ *agagrus*, β *hircus*, GMEL. Syst. Nat. Linn. I. p. 193. DESMAR. Mam. p. 482. FR. CUV. Dict. des Sc. Nat. VIII. p. 509.
Bouc et Chèvre, BUFFON, Hist. Nat. V. p. 59, t. viii. ix.
Common Goat, PENN. Brit. Zool. I. p. 35, t. iii. SHAW, Gen. Zool. II. p. 385.

THE opinions of naturalists have been much divided respecting the original stock of our Domestic Goat ; some

referring it to the *Ægagrus*, and others to the *Ibex*. Buffon appears to have adopted the latter opinion; but most modern Zoologists who have paid much attention to the question, and who have brought to the consideration of it all the helps which recent discoveries in philosophical Zoology have furnished, have leaned to the belief that the *Ægagrus*, or Wild Goat of the mountains of Caucasus and of Persia, is the true original stock. The zoological characters of this animal certainly bear a closer resemblance to those of the domestic breeds; and it is worthy of remark, that the horns of the Persian Domestic Goat, though smaller, are similar in form to those of the *Paseng* or *Ægagrus*. The arguments which have been urged from the intermixture of the *Ibex* with the Common Goat are at present of little value, as the facts recorded are very deficient. The large Goats which are reported to have been brought from the Alps and the Pyrenees to the Garden of Plants in Paris, and which were stated to have been wild, were probably the progeny of the *Ibex* with the Common Goat, as there is no proof of the existence of the true *Ægagrus* in Europe. These were found to be capable of producing offspring, and the details are given by M. Fréd. Cuvier with great clearness; but the old fault still remains; the question is not set at rest by these observations; for we are only informed that they produce offspring, without any statement whether they will breed *inter se*, or only with the Common Goat. The progeny, however, were either prematurely brought forth, or lived only a short time in a sick and languishing condition.

Surrounded by these doubts, and without the power of satisfactorily solving them, it is better perhaps to leave the question to be decided by future experiments, should the opportunity ever occur of determining the results of interbreeding between the *Ibex*, the *Ægagrus*, and the Common

Goat,—particularly with reference to the *mutual* fertility of the offspring.

The Common Goat will produce with the Sheep. “Le mulet qui en résulte,” says M. Fréd. Cuvier,* “participe de la nature de ses parens, et il est fécond ; mais il se reproduit difficilement. J’ai eu un semblable mulet femelle qui, par ses formes, tenoit du mouton, et de la chèvre par ses allures et ses poils ; il ne s’est accouplé qu’à la troisième année avec un bouc et il a été fécond.” Here again is the same lamentable deficiency in the experiment.

The condition of the Goat in some parts of our own islands is much more wild than that of any other of our domestic animals. In the mountains of Wales especially, the Wild Goats roam over the most inaccessible parts of the mountains and rocks, without the slightest appearance of domestication, or of having been deduced from a domestic stock. It is a hardy, active, powerful animal ; capable of maintaining its footing on the smallest point on which its feet can possibly rest, and of taking considerable leaps with the utmost certainty of safely alighting, although the spot which it desires to attain be perhaps but the rugged point or ledge of a precipice. It will thus find its food in places inaccessible to almost all other animals, and live and thrive by cropping the scanty herbage which they furnish. In the mountain ranges of Europe, on the Alps and the Pyrenees, the Goat is found at a great elevation, approaching as near the line of perpetual snow as it can find the scanty means of its sustenance ; and it feeds on many plants which to other ruminants are distasteful, and even deleterious : thus, hemlock, henbane, and *digitalis* is eaten by it with impunity, and even the acrid *euphorbia* is not rejected.

It is easily tamed, and becomes greatly attached to man :

* Dict. des Sc. Nat. VIII. p. 512.

evincing much fondness for his society, and the utmost playfulness and kindness to those who caress it : the playfulness of the Kid is indeed proverbial. Many persons keep Goats in their stables, from an idea that they contribute to the health of the Horses ;—a fancy not perhaps so far-fetched or absurd as at first sight it may appear ; for I believe that all animals are kept in better temper and greater cheerfulness by the presence of a companion than in solitude, and the active and good-humoured Goat may in this way really perform the benefit which has been attributed to it upon mistaken grounds ;—indeed, instances of close attachment between the Horse and the stable Goat are not unfrequent.

The female Goat goes with young five months. She produces usually two Kids, and has that number of mammæ on a large pendent udder. The wars of the males in the pairing-season are as violent as those of the Stag, though, from the nature of their weapons, not quite so bloody. In making his attack, the Goat rises on his hinder legs, and comes down again with immense force, bearing his whole weight and great strength full upon his adversary's ribs or shoulders.

The Goat is a most useful animal, and, from its habits, capable of being reared in localities whence the Ox and even the Sheep are wholly excluded. The skin of the Goat was an early article of clothing : its long soft hair still continues to form the staple of some of the most elegant and durable articles of dress, and is the basis of the celebrated Cashmere shawls, as well as of real Camlets. Beneath the long hair is a soft woolly down, which is also susceptible of being woven into a beautifully soft and warm texture. The skin is manufactured into the best Turkey or Morocco leather ; and that of the Kid is well known as forming the softest, the most durable, and the most beautiful leather for gloves and other articles. The flesh is eaten, and if young, is not

otherwise than palatable ; and that of the Kid is by many considered a delicacy. The milk afforded by the female Goat is nutritious and easy of digestion, and is said to be more wholesome for invalids than that of the Cow. It gives but a small quantity of cream, but produces a peculiar kind of cheese of a strong and rich flavour.

The usual colour of the Domestic Goat is black and white, or a dull pale reddish brown, with a black line along the back. The beard is often of considerable length, particularly in old males ; in which the horns are sometimes almost three feet long ; they are rounded posteriorly, angular on the anterior edge ; transversely rugose ; and rise from the bone, first perpendicularly, afterwards bending outwards and a little backwards.

Goat, anciently *Geet*, from the Goth. *gaiti*. A. S. *gat*, *gat*. Ger. *geis*. From the Greek *χαίρη*, *coma* (?), Junius. Probably, as Wachten suggests, from the A. S. *gytsean*, *concupiscere*.—Formerly the male was called in England the *Buck-goat*, as by the French it is still denominated *Bouc*, whilst the female is termed *Chèvre*, evidently from *Capra*.

RUMINANTIA.

CAPRIDÆ

Genus, *Ovis*.

SHEEP.

Generic Character.—Horns hollow, persistent, rough and angular, more or less spirally twisted; chin beardless; tail moderately short; mammæ two; an open sac at the base of the toes on each foot.

COMMON SHEEP.

Male, RAM. Fem. EWE. Young, LAMB.

Ovis arics. Linn.

Specific Character.—Horns compressed, lunated.

Wild :—

Ovis musimon, SCRIBER, 286.

Ovis ammon, LINN. Syst. Nat. I. p. 95. (part.) ERXLEB. Syst. p. 250. 2. (part.)

Capra musmon, BONAPARTE, Fauna Ital.

Domestic :—

Ovis aries, LINN. Syst. Nat. I. p. 97. 1. MULL. Zool. Dan. Prod. p. 6. 40. ERXLEB. Syst. p. 242. 1. DESMAR. Mammal. p. 488. FLEM. Brit. An. p. 25. JENYNS, Brit. Vert. p. 37.

Capra ovis, BLUMENB. Naturg. X. p. 116.

Bélier—*Brebis*, BUFFON, Hist. Nat. V. p. 1, t. i. ii.

Sheep, PENN. Brit. Zool. I. p. 27. SHAW, Gen. Zool. II. p. 385.

THE search for the wild origin of our Domestic Sheep appears to be more successful than that which has been made for the original race of most of our other domesticated animals. Whilst we are still without any satisfactory knowledge respecting the wild type of the Dog, the Horse, and

the Ox, the Domestic Goat and Sheep are with tolerable certainty traced to animals still existing in a state of nature, and sufficiently accessible to afford opportunities of comparison, and even of experiment. The general opinion is that the Mouflon, or Musmon, an animal inhabiting Sardinia and Corsica, is the type from which all the varieties of the Domestic Sheep are derived; and the characters of this species are such as to afford the most reasonable probability that the opinion is correct.

The covering of the Mouflon, however, differs considerably in its appearance from that of the Domestic Sheep; and it is customary to account for the difference in the following manner:—It is said by all the naturalists who have written on the subject that the pelt of the Mouflon consists of long hair, forming the apparent covering, and of a short soft wool beneath, which is only visible when the former is removed. It is therefore presumed that by domestication, this interior covering is developed at the expense of the former, and becomes the woolly pelt of the domestic races. This, however, is totally erroneous. The longer hairs of the Mouflon are in their structure as genuine wool as that of the Sheep: they are coarse and stiff, it is true, and nearly straight; but they possess the essential character of wool, in the imbricated scaly surface, which gives to wool that remarkable felting property upon which its peculiar utility, in many cases, depends. It is also somewhat waved; and it requires no considerable change to convert such a filament as this into one of fine curly wool. On the contrary, the short soft pelt which lies at the root of this, is nothing more than extremely fine hair, uniform and smooth over its whole surface, and not assuming the slightest appearance of the woolly texture. I have examined these two kinds of hair of the Mouflon from various parts of the animal, and have found no essential variation.

There are few more difficult and less satisfactory inquiries than those which relate to the specific characters of our hollow-horned ruminants. Whether we consider the *Bovidae* or the *Capridæ*,—the Oxen, or the Goats and Sheep,—we are almost equally unable to decide on the limits of species and varieties; and it would appear that this tendency to variation in the wild types is in direct relation to their proneness towards domestication. Even to the present day, there appears to be some doubt whether the Argali of Asia may not be a geographical variety of the Musmon, and whether, therefore, different stocks of Domestic Sheep may not have originated from the two forms. These and similar questions are only interesting in the degree in which they can be satisfactorily answered; as their importance consists solely in their bearing upon another question,—what are the characters and circumstances which constitute specific distinction? Without, therefore, entering upon this extensive inquiry, I shall presume that the Musmon is the origin of our Domestic Sheep, and conclude that the differences of their characters arise exclusively from domestication.

That Sheep of some species or other were bred for their skins and milk in the earliest ages of the world, we have the testimony of the Inspired Volume to prove. Whether the antediluvian flocks were of the same species as our own—whether the wool had at that early period assumed the curled crisp character which characterises it at present,—these, and other questions, however interesting, cannot now receive even a plausible reply. We know that the young of the Sheep constituted the victim of the earliest sacrifices, and that the same animal was the most important, because the most clearly typical subject of the Jewish offerings. It does not appear that it was anciently a favourite article of food; nor is it in the present day, excepting in this country, esteemed so

highly as some other kinds of meat. But in all countries, and in all ages, it has constituted one of the most useful animals which has ever been reduced under the immediate domination of mankind, from the exceeding value of its woolly covering, as the basis of the most wholesome and comfortable and durable articles of clothing, and for its milk, which it yields in considerable abundance, and which is at once pleasant and highly nutritious.

There probably is not a species amongst all our domesticated animals which in its historical relations is so interesting as the Sheep. Its early domestication, its employment as the subject of the first sacrifices, its typical character as an offering of atonement, its importance as forming the principal wealth of the early patriarchs—its various connexion, in short, with the political, the religious, and the domestic customs of those primitive magnates of the Jewish nation, are all of them subjects affording ample food for deep and delightful reflection. The relation which existed between the patriarchal shepherds and their flocks was indeed of so intimate and even affectionate a nature, as to have afforded the subject of many of the most beautiful and touching parables and moral illustrations in the Sacred Writings. It is scarcely necessary to refer to the unequalled appeal of Nathan to David, to the still higher and prophetic allusion to the character of the Messiah, or to the sublime illustration of the beneficence of “the great Shepherd of Israel,” in the beautiful and well-known pastoral psalm. These are subjects which cannot be discussed here; but it is impossible to pass them wholly without notice. But the historical interest attached to this animal does not stop here. The customs observed in the treatment of their flocks by the shepherds of the Eastern nations in the present day, offer numerous

and highly important coincidences with those incidentally alluded to or more distinctly described in the Scriptures.

The principal uses to which Sheep are applied, at least in this country, are the manufacture of the wool into various kinds of clothing, and of the skin into leather, which is employed in making gloves, forming an inferior kind of binding for books, and other uses,—and the employment of the flesh as food. In many foreign countries the flesh of the Sheep is not eaten, or eaten but in small quantities; and in these the milk supplies both butter and cheese, of a peculiar, but not unpleasant flavour. The manufacture of Ewe's milk cheese has indeed now nearly disappeared from this country, being confined to some remote parts of the Highlands of Scotland and to Wales. The best I have tasted was from Glamorganshire. This cheese is tart and highly flavoured, and is esteemed by many as much finer than that of the Cow.

The principal point for our consideration, however, is the wool,—that warm and matted covering, which, from the possession of a single peculiar property, is capable of being manufactured into numerous modifications of a most beautiful species of clothing. This property is called *felting*, and consists of the close attachment of the hairs to each other, produced by the imbricated scaly surface of each individual hair: for although it cannot in strictness be said that the broadcloths, the flannels, and all the various articles of woollen manufacture are absolutely *felted*, yet the peculiar manner in which the wool is woven, and its texture when manufactured, depend upon this property. It has been already stated that the wool of the Mouflon is certainly the original state of the fleece of the Sheep, which has become thus improved by care and breeding, until its original coarse character has wholly disappeared. The mixture of

two kinds of hair is not confined to the Sheep and its near affinities ; it probably, indeed, belongs to nearly the whole of the Mammalia ; but in the greater number of species it is very conspicuous. In the whole of the *Mustelidæ*, particularly in the Otter, in the Badger, and in many *Rodentia*, it is always found, as well as in some ruminants ; and Mr. Youatt states that he has obtained a considerable quantity of wool from an Italian Wolf Dog, and several other animals. The object of this twofold covering is obvious and highly interesting. The outer or longer hair is generally more or less firm, glossy, and disposed principally in one direction ; the under coat is, on the other hand, soft, closely-set, and more or less curling : the latter is intended to preserve the necessary temperature of the body, and the former to protect it, as well as the skin, from external injury. It is then only the excess and modification of a natural product which distinguishes the Sheep, as a woolly animal, from those which are furred or hairy. Whether the wool of the Sheep be in its nature deciduous or not, appears scarcely to have been proved as yet. It is certain that in most cases the wool, if not removed by art at a certain period of every year, becomes ragged, and comes off in loose matted portions, hanging to bushes, or any other points against which the animal has rubbed to get off the superfluous and loosened part of its clothing. There are, on the other hand, many instances of the wool remaining on for several years, still continuing to grow, until it had reached the length of from ten to twelve or thirteen inches. This, however, must be considered as an exception to the rule ; and there can be no doubt that some plan of divesting the animal of the falling wool by art must have early suggested itself to those whose interest it was to procure it as entire as possible, without injury to the Sheep. It is probable that, in most cases, the earliest mode adopted for this purpose was that of

pulling off the loosened wool with the hands;—a custom which is still retained in many countries, and until of late was practised even in a remote part of our own; for we find in Low's Fauna of the Orkneys,* that "about Midsummer there is a particular day published for rowing," as this operation is termed, "when all the men in the parish, attended with their Dogs, turn out and drive the whole flock, without any preparation of washing, into narrow pens, and from thence, I may say, to the place of execution, where the wool is torn (not shorn) off their backs,—an operation which brings the whole blood into their skin, and is not only disgusting, but, if the season proves harsh, is the cause of great destruction." In the time of Pliny, the same custom prevailed in some parts of Italy; but it is certain that the great improvement of shearing, or cutting off the wool when about to be shed, was employed not less than eighteen hundred years before Christ, as it is distinctly stated that "Laban went to *shear* his Sheep."

It is in this country, and in this alone, that the most useful properties of the Sheep have been fully appreciated and improved. The superiority of the Cow, as furnishing the important article of milk and its different preparations, has occasioned the English agriculturist to neglect this product of the Sheep, and to devote his attention to the more important benefits which it confers upon us,—its fleece and its flesh. And although in some countries where every other object is sacrificed to the improvement of the wool, this article may be produced in a still higher state of perfection than in this, yet the great advantage which we derive from considering the flesh of the animal also as a matter of importance, renders it altogether much more valuable than could be the case were one only of its products made the object of our

* Fauna Orcad. p. 7.

care. The recent improvement in the character of British wools, produced by a judicious mixture of the Spanish breed, has also brought this article to a high state of perfection ; and the wool even of one of our remote colonies—Australia—is also fast acquiring a similar degree of excellence.

Having already alluded to the curious peculiarity possessed by wool of felting, or becoming more and more closely combined by the action of beating, rubbing, or boiling, a short account of this singular process and of its probable cause may not be uninteresting. The two following instances will serve as illustrations : they are taken from Mr. Youatt's work on Sheep :—" The hatter takes a certain quantity of wool cut into short lengths, and with an instrument resembling a bow he beats and tosses them about until he has completely separated them from each other, and they lie in all kinds of directions, and he has got a layer of them of sufficient thickness for his purpose. He then moistens them, and covers them with a cloth, and presses them and moves them about backwards and forwards in every direction until he finds that they are working themselves into a compact mass. In proportion as this mass is formed, he increases the pressure until it acquires the firmness that he wishes.

" The cloth merchant weaves his cloth ; but he has been compelled to use a considerable quantity of oil in the manufacture of it, which must be got rid of ; and, at the same time, his fabric is too open and the threads are too apparent to suit with the fashion of the times, or to be as smooth and soft and comfortable in wearing as it is required to be. He sends it to the fulling mill. It is put into a large trough with water, in which some argillaceous earth has been dissolved, and which combines with the oil, and gets rid of it in the form of soap. In order that the argillaceous earth may penetrate every part of the cloth, and every particle of the

grease be removed, the fabric is passed rapidly and repeatedly through tight rollers; and then, fresh water being let in upon the cloth, (the process through the rollers still continuing,) it is washed perfectly clean. The cloth is now put into the fulling mill or stock, a certain quantity of soap being first carefully and evenly laid on it. By the joint influence of the moisture and the pressure, certain of the fibres of the wool are brought into more intimate contact with each other; they cohere,—not only the fibres, but, in a manner, the threads cohere, and the cloth is taken from the mill shortened in all its dimensions: it has become a kind of felt; for the threads have disappeared, and it can be cut in every direction with very little, or no unravelling; it is altogether a thicker, softer, warmer fabric.” The washing of flannel or of worsted hose is universally known to cause the fabric to contract or shrink, as it is termed, and in every direction become thicker. This too is from its property of felting.

This property has been accounted for in different ways; the most probable is, that it depends upon the scaly surface of each woolly fibre: the scales, being imbricated and all placed in one direction, act as so many barbs, hooking on to each other as the fibres are pressed into mutual contact; and as they can only move in one direction, when these scales have taken hold, the more the felted wool is beaten or rubbed, the closer and more intricate becomes the web.

The activity of the Domestic Sheep is scarcely deteriorated from that of the Mouflon. No one whose observations on these animals have been confined to the safe and even pastures of the inland part of the country, can have any adequate idea of the boldness and agility with which the Sheep of the Welsh mountains leap from crag to crag, emulating the Goats in activity and strength. The hazardous and precipitous rocks of the southern coast, the bare perpendicular

surfaces of which are but slightly indented here and there with ledges just sufficient for a Sheep to stand upon, are also the frequent resort of these sure-footed beasts. I have seen on the rocks of the south-western coast of the Isle of Wight, where they rise perpendicularly from the sea to a height of several hundred feet, many of these wanderers, which have descended from the high downs on the summit, and which, leaping from ledge to ledge, have approached in some instances very near to the base, which is eternally lashed by the billows of the Channel. Viewed from the sea, they appear to be stuck against the flat surface of the rock, and are with difficulty distinguished from it. Yet they reascend, bounding upwards with a sureness of step and a strength of spring which remind the spectator of the movement of the Goat or the Chamois. I remember to have seen a Ewe with her lamb standing more than half-way down the rock, grazing on the sweet but scanty herbage which gives an occasional spot of green to the white face of the chalk:—how the poor little frail thing could ever regain the summit, was a problem beyond my power to solve; but the boatman, who was accustomed to witness such freaks, assured me that there was no danger; and surely the same instinct which prompted the mother to lead her tender charge to such a place, would dictate to her how far the descent may be attempted with safety to its weakness.

England boasts of as many different breeds of Sheep as of the Ox. Of all of them it is unnecessary to speak here. The Welsh Sheep, which are remarkably small, are suffered to run wild about the mountains; and their flesh thus acquires a delicious flavour, which almost rivals that of venison. This breed is strongly contrasted with the large Leicester, and other highly-cultivated breeds. I have selected for illustration, the Ram of the horned, white-faced, long-tailed

Dorset breed, and the Ewe of the hornless, black-legged, and black-faced Southdown.

The generic character of *Ovis* as distinguished from *Capra* is not very apparent ; but there is one character not generally known or appreciated which I am inclined to believe unexceptionable. It is the existence in the genus *Ovis* of an interdigital sac on each foot, which is wanting in *Capra*. It is found in the Argali, in the Musmon, and in all the varieties of the Domestic Sheep, and consists of a sac or fossa, situated at the base of the toes, lined with hair, and furnished with sebaceous follicles. I believe we are indebted to Professor Genè of Turin for the first application of this fact to the generic distinction between the Goats and Sheep ; and it is particularly alluded to by my excellent friend the Prince of Musignano, in the description of the Mouflon in his beautiful *Fauna Italica*.





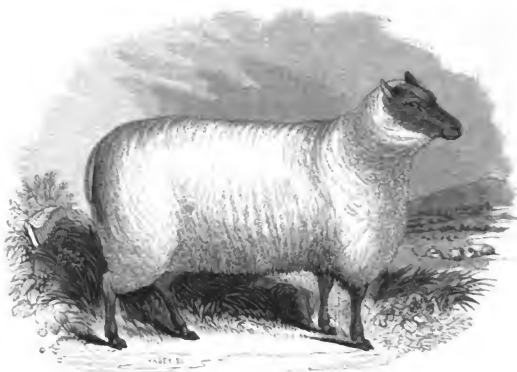
THE DORSET BREED.

THIS is a handsome though somewhat old-fashioned breed, which is principally esteemed for its producing Lambs earlier than any other perhaps in this country ; many of them being dropped as early as September. “ By many farmers,” says Mr. Youatt, “ the practice of house-suckling the Lambs is managed on a large scale. By all of them, however, a building is usually set apart for this purpose, divided into a certain number of coops for the division of the Lambs according to their ages. Every evening the Ewes are turned into the respective divisions of the Lamb-house, and each mother speedily recognises her offspring. They remain together until the following morning, when they are separated, and the Ewes driven back to the pasture.” In addition to this means of nourishment, those Ewes whose Lambs have

died or been taken away for sale are employed as foster-mothers ; and thus these early Lambs, provided with a double supply of milk, and preserved from all the inclemency of the season, become fit for the market in about eight weeks, and are then sold at a high price.

To the eye of him who seeks for beauty in harmony and proportion, this Sheep is one of the handsomest in any part of England. The strong well-formed body and limbs, the clear white fleece, the finely-curved horns, and other points, will to him constitute a more pleasing combination of characters than is to be found in those breeds which have become more changed from the old stock by repeated transmission of peculiarities, which, however advantageous to the breeder, whether for the sake of the fleece or the flesh, cannot be considered as adding to the abstract beauty of the animal.





SOUTHDOWN BREED.

FEW breeds of Sheep have been more generally employed for general purposes than the one which I have here selected as an example of the Hornless variety. It takes its name from an immense tract of downs, formed by a long range of chalk hills extending more than sixty miles in length, through part of the counties of Sussex, Surrey, and Kent. The wool of the Southdown Sheep has always been considered as tolerably good; but the figure of the Sheep was formerly very inferior to that of many others. It would perhaps be difficult to select a more remarkable instance of the advantages of a careful selection of stock for breeding than is exhibited in this breed of Sheep; the great improvement of which during the last few years has arisen, not from crossing with other breeds, but from the system of sorting the flocks. From this source is to be traced a marked amelioration in the figure and size of the animal, as

well as in the quality and quantity of the wool. The Southdowns, in fact, have of late years extended to most parts of England, and even into Ireland;—a sufficient proof of their real value. The various breeds of Sheep are technically divided into short wools, middle wools, and long wools; and for an account of these, and indeed for an admirable detail of every important circumstance connected with this most useful animal, I have again to refer the reader to Mr. Youatt's valuable work on the Sheep.

I cannot conclude this portion of the work without recommending to the perusal, not only of those who are practically interested in such subjects, but of every one in search of general information, the Treatises by the gentleman just named on the Horse, on Cattle, and on the Sheep, as containing a larger mass of knowledge, more extended research, and the practical application of more judicious principles of management, than can be found in any other works on the same subjects.



Order, CETACEA.

WHALES.—DOLPHINS.

THERE is not in the whole range of natural knowledge a study more variously and deeply interesting than the investigation of the laws by which those variations of structure are governed, which have for their object the application of the same organs, or sets of organs, to different and even opposite functions in animals of various forms and habits. We have already seen the same bones which, in a consolidated and apparently clumsy form, are destined to support the dense ponderosity of the Elephant, attenuated and lengthened into the slight and frail framework upon which the delicate membranous wings of the Bats are extended; and we now have to investigate a group of beings in which the corresponding bones are modified, in consonance with the general form and essential habits of the animals, into perfect fins, to direct and impel their course through the boundless depths of the ocean.

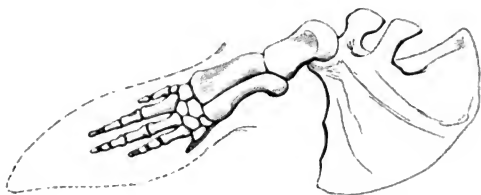
The outward form of the cetaceous animals, organised as they are for a permanent residence in the ocean, resembles so nearly that of the fishes, that the ancients were wont to arrange them together. Ray himself was not prepared to separate them from the fishes; and even the example of the great Linné, who with his wonted correctness and judgment placed them in their true position, was not sufficient to counterbalance the prejudices of Pennant, whose knowledge of the true principles of zoological science was too limited to enable him to look beneath the surface. Hence he fol-

lows Ray, and considers the Cetacea as forming a division of the class of fishes ; and this notwithstanding he was well aware that they bring forth their young alive, and nourish them by means of mammary organs, similarly constructed to those of the whole class of Mammalia.

This fact, however, being established, it becomes a matter of great interest to ascertain what relation the other organs of the body bear to the corresponding ones in the other groups of this class, and by what modifications of structure they are rendered subservient to a mode of life so different from that of the more typical forms. These huge beings, then, have all the essential characters of mammiferous animals : they have warm blood, a complete double circulation ; they breathe the atmosphere by means of true lungs ; and their reproduction and the nourishment of their offspring associate them with the true mammiferous type. A brief notice of the principal points of their organisation, as far as they bear upon these apparent anomalies, will show that the most important variations in form and habits are provided for by the modification of those structures which are essential to the type of the group, rather than by their abolition and the production of new organs.

The general form of the Cetacea is similar to that of fishes, in the horizontal elongation of the body, the rounded and smooth surface, the gradual attenuation of the extremities of the trunk, and the development of fins and especially of the tail as means of progression. The arrangement of the bones composing the anterior limb is one of the most important and curious parts of this subject. The whole of the fin consists of exactly the same elements as those which compose the arm and hand of man ; but so concealed underneath the thick skin which envelopes it, that not a trace of these bones is to be seen externally. In this respect an

intermediate structure is exhibited by the anterior extremities in the Seals. The woodcut gives a view of the bones of the anterior extremity in the Common Porpoise; and the surrounding outline shows the form of the fin as covered by the integument.



There are several striking peculiarities observable in the structure of this part in all the Cetacea. The bones, so lengthened and extended in the Bats, are here contracted in their longitudinal dimensions as well as in thickness, but expanded laterally to a considerable extent; the bones of the wrist are consolidated into one,—a wise provision, where strength rather than mobility is required in the actions of the limb.

The posterior extremity is, in the whole order, either absolutely wanting, or merely rudimentary. In the latter case, its only vestige consists of certain small bones, the imperfect representative of a pelvis, suspended, as it were, in the flesh, and having no connexion with the spinal column. In this respect a striking difference is observed between these animals and the Seals: in the latter, the posterior extremities are carried backwards, and perform the office of a true caudal fin; but in the Whales, this most important organ of

progression consists of an extremely broad and powerful horizontal disk, varying in figure in the different genera, but in all constituting the principal instrument of locomotion. This extraordinary organ is not placed vertically as in fishes, but horizontally; and the admirable adaptation of such a peculiarity in its position to the requirements of the animal forms a fresh and beautiful illustration of the perfection of creative wisdom. The fishes, respiring only the air contained in the dense medium in which they live, do not require any access to the atmosphere; and their progression therefore is principally confined to the same plane: but the Whales, breathing the atmosphere, are necessitated to come to the surface for each respiration, and hence require an oar of inconceivable power, the position of which applies its impulse in a vertical direction, so as to impel their ponderous bodies from the lowest depths of the ocean to the surface, every time the lungs require to be replenished with fresh air. The greatest rapidity of motion is produced by alternate strokes of the tail against the water, upwards and downwards; but their more ordinary progression is effected by an oblique lateral and downward impulse, first on one side and then on the other, as a boat is impelled forwards by a single oar in the act of sculling. The extent of the tail in some of the larger species is enormous; its superficies being no less than about a hundred square feet, and its breadth considerably upwards of twenty feet.

But if this powerful implement be necessary to raise the Whale into contact with the atmosphere, the immense depth of water from which he is thus raised, implies a superincumbent pressure so immense as to require some extraordinary condition of the body to prevent its absolute destruction. The most obvious means for meeting this enormous pressure, which in some cases must amount to one hundred

and fifty-four atmospheres, or about a ton upon every square inch, is a thickening of the integument, or the production of some incompressible substance which shall invest the whole animal; and we find this object to be effected in a manner which must excite the greatest admiration. A mere thickening and condensation of skin, or a simple covering of fat, would have been insufficient for the purpose; but by an extraordinary combination of these means the object is at once obtained. "That structure," says Professor Jacob of Dublin, "in which the oil is deposited, denominated blubber, is the true skin of the animal, modified certainly for the purpose of holding this fluid oil, but still being the true skin. Upon close examination, it is found to consist of an interlacement of fibres crossing each other in every direction, as in common skin, but more open in texture, to leave room for the oil. Taking the Hog for an example of an animal covered with an external layer of fat, we find that we can raise the true skin without any difficulty, leaving a thick layer of cellular membrane, loaded with fat, of the same nature as that of other parts of the body: on the contrary, in the Whale it is altogether impossible to raise any layer of skin distinct from the rest of the blubber, however thick it may be; and in flensing a Whale, the operator removes this blubber or skin from the muscular parts beneath, merely dividing with his spade the connecting cellular membrane."*

The author of the introductory chapter on the anatomy of these animals, in Sir William Jardine's excellent little work on Whales,† observes that "a soft wrapper of fat, though double the thickness to that usually found in the Cetacea, could not have resisted the superincumbent pressure; whereas by its being a modification of the skin, always firm and

* Dublin Phil. Journ. I. p. 356.

† Naturalist's Library, Mammalia, vol. VII. p. 48.

elastic, and, in this case, being never less than several inches, and sometimes between one and two feet thick, it operates like so much caoutchouc, possessing a density and resistance which, the more it is pressed, it resists the more."

But this is not the only use of this remarkable structure. The whole of the Cetacea resemble the rest of the class in having warm blood; and in the dense media in which they live, and which is so rapid a conductor of heat, some protection is absolutely necessary to prevent the too speedy loss of caloric, and the consequent destructive expenditure of nervous fluid, the influence of which is essential as the means of its continued restoration. "Hence," says the author just quoted, "this wrapper or blanket, as it has been appropriately called, being a bad conductor of caloric, will at once resist the surrounding cold and retain the animal heat. On this account alone such an integument seems essential; its bulk and quantity are enormous, sometimes weighing thirty tons, which might appear sufficient to overwhelm the animal, and yet, from its being specifically lighter than the waters of the ocean, instead of oppressing, it buoys it up, and makes it relatively lighter."

The respiration of these animals is another important part of their physiology, which bears so directly upon their habits as to require some explanation here. One of the most remarkable peculiarities in this function is the length of time that the large species will remain under water without respiring; some of them even as long as an hour and a half. A very remarkable structure connected with the circulation, and first discovered by Hunter, appears, from the observations of the author last quoted,* to be the means adopted to allow of this extraordinary slowness of respiration; and I refer to the work just mentioned, and to the article "Ceta-

* Naturalists' Library, Mammalia, vol. VII. p. 51.

cea" in the Cyclopædia of Anatomy and Physiology, for a full account of the structure and its function.

The nostrils or blow-holes of the Whales are placed on the upper or vertical aspect of the head,—a situation well calculated to facilitate the act of respiration, as coming into immediate relation with the atmosphere as soon as the top of the head reaches the surface of the water. Considerable controversy has existed as to the nature of the spouting of Whales; some contending that, from the structure of the parts concerned in this curious act, nothing more than air and mucus can be thrown out from the blow-holes,—or, at most, that the water which is between them and the surface is blown up into the air. As a matter of fact, however, this is certainly erroneous, if any dependance be placed upon the numerous and credible testimonies of many who have often witnessed the phenomenon. It appears from the report of actual observers, that often, when the blow-holes are far out of the water, a jet of water of considerable size is thrown up with great force and to a considerable height;—a circumstance which can only be accounted for by supposing that the water taken into the mouth, and carried back into the pharynx, is then regurgitated by the blow-holes. As this is not the place to go into minute anatomical details, it may be sufficient to state that some of our first anatomists have declared that the structure of this part is such as to favour the latter opinion, and sufficient satisfactorily to account for it.*

* Mr. Bennett, in a paper recently read before the Zoological Society on the habits of the Cachalot, distinctly states that this animal does not throw water from the blow-hole, and that the spouting consists of nothing more than the accumulated mucus and condensed vapour of expiration; but we have not only the positive attestation of M. Lesson, who declares that he has seen them spout water when he was within a few yards of them, but the admission of the former writer himself, who says that the blow-holes serve to carry off the water received into the mouth when feeding. The discrepancy may probably have arisen from the fact that some species spout more than others.

The testimony of Cuvier is directly in favour of the affirmative opinion. He has described minutely the structure of the part in the Porpoise, and he thus details the action of this beautiful contrivance :—" Let us suppose the Cetacea to have taken into its mouth some water which it wishes to eject. It moves its tongue and jaws as if it were about to swallow it ; but, closing the pharynx, it forces the water to mount into the nasal passages, where its progress is accelerated by annular muscular fibres, until it raises the valve (between the nasal passage and two pouches or reservoirs), and distends the membranous pouches above. The water once received into these pouches can be retained there until the animal wishes to spout. For that purpose it closes the valve to prevent the descent of the water again into the nasal passages below, and forcibly compresses the pouches by means of the fleshy expansions which cover them : thus compelled to escape by the narrow crescentic aperture or blow-hole, it is projected to a height corresponding with the force of the pressure."^{*}

The closing of the blow-hole is another object of great importance, and is provided for by equal wisdom and skill. Here, again, it was necessary that the structure should be such as to guard against the immense pressure of the super-incumbent water. For this purpose a common membranous valve would have been wholly unavailing ; and we find accordingly that the orifice is covered by a continuation of the common integument, connected with a valve of so dense a structure, and so perfectly adapted to the opening, that whilst no degree of pressure can disturb or injure it, not a drop of water can pass between its sides and the tube which it closes. The texture of this conical stopper is like that of

* See particularly Fréd. Cuv. Hist. Nat. des Cétacées, and Cyclop. of Anat. and Physiol. art. *Cetacea*.

very hard thick leather, or the hide of the Rhinoceros, being composed of numerous fibres, so closely interwoven and compressed that it is difficult to cut it with a knife.

The voice of these animals has also been a controverted point ; but the weight of testimony seems to be strongly and incontestably in favour of its existence. The noise produced merely by the passage of the air through the spiracles in the act of respiration or spouting will not at all explain the accounts, numerous and well-authenticated, which have been given of the sounds produced by these creatures. These narrations represent the noises which some of them utter as being tremendous. It has been compared in some large species to the bellowing of Bulls ; and in others, the cries are said to have been acute and distressing. In the account of the Porpoise will be found an additional attestation of the cries of that species, which in this instance, as in others, were evidently uttered as a sign of great distress and fear.

This circumstance, associated with the considerable development and peculiar structure of the organ of hearing, would lead to the conclusion that Whales have the power of communicating with each other under the water, and even at great distances. This will probably account for the well-known facts of Whales, when in distress, being able to bring others to their aid, or to alarm them by information of the danger ; facts of which many are recorded by persons engaged in the different Whale fisheries.*

There is one other portion of the natural history of these strange but interesting animals which deserves especial notice : this is their viviparous reproduction, and the lactation of their young. The whole of their habits regarding this important function of their life bear a perfect analogy to those of the other *Mammifera*. Not only are the young

* See Beale's account of the Whale-fishery of the South Seas.

brought forth alive, but the mother exhibits towards them the utmost affection and solicitude ; in many species holding them under her fins, and protecting them with the greatest care and courage from every assailant. The details of these circumstances, as they vary in the different groups, will be given hereafter ; and numerous instances are on record which allow not the slightest doubt of the general truth of such attributes as have been mentioned. It must at the same time be confessed that many of the accounts which have been given of the habits of the Whales would, if true in all their details, imply such an intimate acquaintance with them on the part of the writers, as could only have been enjoyed by seeking with them the deep recesses of the ocean, travelling in their company from place to place, and watching their most retired habits with all the calm observation with which the farmer watches his domestic cattle ! Rejecting such fabulous stories as these, enough remains to excite the greatest interest, and to claim for these animals the same admiration of their habits and instincts as we bestow on those which are far better and more generally known.

The female has two teats, which in the herbivorous group are placed immediately behind the fins, and are therefore pectoral : in the others they may be termed inguinal. It is still a question on which different opinions are maintained, whether the milk is sucked by the action of the mouth of the young one, or pressed into its mouth by the muscles which cover the mammary glands in the mother. The objections to the former supposition are nugatory : such an action is quite possible in the water, and it is therefore most probable that the usual mode of obtaining the milk is not departed from in these animals. On the other hand, the injection of the milk by the action of the maternal organs is not without the support of analogy. That such is the mode

of supplying the young in the Marsupial animals is beautifully shown by my friend Mr. Morgan, in his paper on the Mammary Organs of the Kangaroo, in the Linnean Transactions, in which a complicated muscular apparatus is demonstrated, applicable to this express purpose ; and it is worthy of remark that the milk gland in the Whales is also invested by a muscular covering.

The arrangement of this order into families is a task of no small difficulty. There are, it is true, some groups which appear to allow of no hesitation, and are as perfectly satisfactory as those of many of the more typical forms. Such are the graminivorous group forming the family *Manatidæ*, the Dolphins or *Delphinidæ*, and the *Balænidæ* or true Whales. But there are certain genera which from their structure appear almost to be typical of separate families ; such is especially the case with the narwhal or *Monodon*, in which the structure of the teeth differs from that in all other forms, and particularly in those with which its general aspect would most nearly associate it. The genus *Hyperoodon* is similarly isolated. Yet upon a close examination even of these forms, there is an obvious chain of affinity supplied by them, from the *Delphinidæ* to the true Whales, or *Balænidæ* ;—a view of their relations to each other which yet requires and deserves a more elaborate investigation than has hitherto been devoted to it.

CETACEA.

DELPHINIDÆ.



Genus, DELPHINUS.

DOLPHIN.

Generic Character.—Both jaws with numerous simple and equal teeth ; snout produced into a beak, separated from the forehead by a depression. A dorsal fin.

THE COMMON DOLPHIN.

Delphinus delphis. Linn.

Specific Character.—Teeth more than forty on each side both of the upper and lower jaw, slender, pointed, and slightly curved. Jaws nearly of equal length, moderately produced.

<i>Δελφίς,</i>	ARIST. Hist. Anim. l. vi. c. 12.
<i>Delphinus,</i>	PLIN. Hist. Nat. l. ix. c. 8.
„ <i>antiquorum,</i>	RAY, Syn. Pisc. 12.
„ <i>delphis,</i>	LINN. Syst. Nat. I. p. 108, n. 2. MULL. Zool. Dan. Prod. p. 7, n. 55. ERXLER. Syst. p. 621, n. 2. DESMAR. Mammal. p. 514, sp. 758. FLEM. Brit. An. p. 35. JENYNS, Brit. Vert. p. 40.
<i>Dauphin,</i>	BRISSON, Reg. An. p. 369, n. 1. LACEP. Hist. des Cét. p. 250, t. xv. f. 1.
<i>Dauphin vulgaire,</i>	FR. CUVIER, Hist. Nat. Cét. p. 123.
<i>Dolphin,</i>	PENN. Brit. Zool. III. p. 65. SHAW, Gen. Zool. II. p. 507, t. cccxix.
<i>Common Dolphin,</i>	JARDINE, Nat. Hist. of Whales, p. 238, t. xxiii.

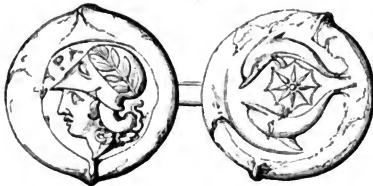
THE mythological and poetical associations which belong to this species,—its reputed attachment to mankind, its bene-

ficient aid in shipwreck and various marine disasters, its dedication to the gods, and many other attributes expressive of the high estimation in which it was held by antiquity,—afford a striking example upon how slender a basis the unrestrained imagination of the ancients could raise the most elegant and gorgeous structures both of poetry and religion. Stripped 'of its fabled qualities, there is indeed enough in the habits of the Dolphin to excite considerable interest even in the sober view of the naturalist. The excessive activity and playfulness of its gambols, and the evident predilection which it evinces for society, are recorded by every mariner. Numerous herds of them will follow and surround a ship in full sail with the most eager delight; throwing themselves into every possible attitude, and tossing and leaping about with elegant and powerful agility, for no other apparent purpose than mere pastime. It is not improbable also that the Dolphin might be sufficiently tamed, if it were kept for a time in partial confinement within the limits of a small lake, to take food from the hand, and to know and follow the person who fed and caressed it. But here the truth of its intimacy with mankind ceases; and from this slight groundwork have arisen all the elegant associations with which the ancient poets have invested it. The escape of Arion on the back of a Dolphin which he had charmed by his music, is one of the least forced of these fables; and the car of Amphitrite drawn across the ocean by a group of the same animals, is a fiction as easy and natural as it is beautiful.

But the naturalists of antiquity seem to have surpassed the poets themselves in the absurdities which they either invented or adopted respecting it. It may indeed almost be supposed, in order to account for these anomalies, that the *Δελφίς* of antiquity was a different animal from our

Dolphin ; but although the ancient accounts of animals are in most cases too deficient in descriptive accuracy to afford any certain indication of the species intended, this can scarcely be said to be the case in the present instance, as there are sufficient points of comparison in the description of Aristotle to render their identity extremely probable at least, if not absolutely certain. But the further we recede from this great father of the science, the more we find ourselves entangled with error and absurdity. The want of precision in the description of *Ælian* becomes in *Pliny* a complication of positive errors ; and *Oppian* even brings the Dolphin on shore to follow the pipe of the shepherd, and to repose and pasture with his flocks.

The ancient representations of its form are not much more consonant with truth than these stories of its habits ; and it requires some stretch of the imagination to identify the blunt round-headed creature, with its curved back and spiny fins, as it is represented in certain ancient coins and statues, with the straight sharp-beaked animal figured at the head of this description. Even here, however, there are exceptions to this general censure ; and there is no difficulty in at once recognizing the Common Dolphin in the animal which is represented on the reverse of the coin of which the following woodcut is an accurate copy. It is a Syracusan coin, and is contained in the British Museum ; but its date and history are wholly unknown.



The general form of the Dolphin is peculiarly adapted for the extraordinary displays of strength, agility, and swiftness, which have already been mentioned as belonging to it. The attenuated and depressed form of the beak serves as an admirable cut-water; and the fusiform body presents no obstacle to its ready passage through the waves. The tail, as in most of the order, forms an oar of immense power, considering the size of the animal; and the posterior half of the body is as flexible as it is powerful. Its gambols are often accompanied by jets of water from the blow-holes, the apparatus for effecting which has been already described. It is a voracious and even gluttonous animal; and the eagerness with which it follows a ship may doubtless in some measure arise from the hope of obtaining food.

Its flesh was formerly considered a delicacy; and it was eaten, as was also the Porpoise, served up with a sauce composed of crumbs of bread, vinegar, and sugar. As all the Cetacea were at that time considered as fishes, the Dolphin and the Porpoise were both permitted by the Church of Rome to be eaten on maigre days. Whether the discovery and general acknowledgment of their real structure and affinities would now require any restriction in this indulgence,—whether, in short, the taboo ought now to be laid upon them,—is a difficulty which, thanks to fashion, is fortunately very unlikely to occur; for the Dolphin and the Porpoise are no longer esteemed as food.

It is indeed stated by M. Fréd. Cuvier, in his admirable and complete work on the Cetacea, that it was only in France that this custom of eating the Dolphin was general; and that the almost sacred character which it acquired from the ancients was in some degree retained by the modern inhabitants of the same classical countries. In England, however,

it was certainly eaten ; and the authority of Dr. Caius goes to show that it was considered a delicacy ; though it is probable that it was never caught in sufficient abundance on our shores to be a common article of food in this country.

The voice of the Dolphin consists only of a low murmur, or suppressed lowing sound.

The female brings but a single young one, which she nurses and suckles with great tenderness and care. The mammary glands at the period of birth become much enlarged, and the teats are exerted ; the young one seizes the teat with its lips, and the mother lies in some degree on one side, in order to enable both herself and her young one to respire whilst the operation of suckling is going on. The milk is abundant, and very rich.

The general length of the Dolphin is from six to eight feet ; but now and then individuals have been seen of ten feet. The body tapers towards the tail, its greatest thickness being just anterior to the dorsal fin. The forehead is abruptly rounded, and descends rather suddenly to the base of the rostrum, which is somewhat depressed, and has obtained for the animal the common French names of “ Bec d'Oie ” and “ Oie de Mer.” The dorsal fin is about nine inches in height, its apex is curved backwards, the anterior margin being convex, and the posterior somewhat concave. The true or pectoral fins are rather longer than the dorsal. The tail is crescentic in its form, and about a foot in breadth. The rostrum is about six inches in length, and separated from the forehead by a slight ridge. The jaws are long and powerful, and are covered by thin and almost immovable lips. The teeth, which vary—according to age, as M. Fréd. Cuvier attests—from thirty-two to forty-seven on each side of either jaw, are acute, slightly incurved, and those of one

jaw lock, in the most perfect and even manner, between those of the upper. The external meatus of the organ of hearing is extremely small, being scarcely larger than a pin-hole. The eye is of moderate size, with a heart-shaped pupil. The blow-hole is crescent-shaped, with the horns directed backwards.

The colour is blackish on the back, greyish on the sides, and glittering white beneath.



CETACEA.

DELPHINIDÆ.



BOTTLE-NOSED DOLPHIN.

Delphinus Tursio. FABR.

Specific Character.—Jaws moderately produced, the lower a little longer than the upper; teeth twenty-one to twenty-five on each side of either jaw, straight, conical.

Delphinus Tursio, FABR. Fn. Groenland. p. 49, n. 31. BONNAT. Cetol. p. 21, t. xi. f. 1. DESMAR. Mammal. p. 514, sp. 761. FLEM. Brit. An. p. 37. JENYNS, Brit. Vert. p. 41. FR. CUV. Hist. Nat. Cét. p. 141.

? *Delphinus truncatus*, MONTAGU, Mem. Wern. Soc. III. p. 75, t. iii. (Cran.) *Nisarnak*—*Nisarnak*, FABR. l. c.

Bottle-nosed Whale, HUNTER, Phil. Trans. 1787, p. 373, t. xviii.

CONSIDERABLE ambiguity appears to have rested upon this rare species of Northern Dolphin, which has been gradually removed by Desmarest, G. Cuvier, and particularly by Fréd. Cuvier in his admirable book already quoted. It now appears certain that the *Nisarnak* of Fabricius and of Bonnaterre, and the first of the two Bottle-nosed Whales figured by Hunter, are identical with the *Delphinus Tursio*. Desmarest and G. Cuvier had at first considered them distinct, but the latter distinguished naturalist afterwards corrected the error, and his brother has subsequently fully established their identity. The first account which we have

of its appearance on our shores is that of John Hunter, already referred to, in which he considered it as the Common Dolphin, *Delphinus Delphis*. The specimen figured was caught, says Hunter, upon the sea-coast near Berkeley, where it had been seen for several days, following its mother, and was taken along with the old one. The latter was eleven feet long.

Mr. Jenyns mentions another instance of its occurrence in the river at Preston, from which the following dimensions are taken :—"Entire length, eleven feet ; girth, seven feet four inches ; length of the mouth, fourteen inches ; from the snout to the eye, sixteen inches ; from the same to the pectoral fin, two feet ; from the same to the dorsal, four feet eight inches ; length of the dorsal fin, twenty-three inches ; height of the same, ten inches."

From all the evidence which can at present be obtained respecting this species, it is clear that it belongs to the genus *Delphinus* proper,—that is to say, of those having an elongated and depressed snout, distinctly separated from the forehead. It is, however, less elongated in proportion than that of the Common Dolphin, and the lower jaw projects a little beyond the upper. The teeth, which are conical, acute, and a little bent backwards, are from twenty to twenty-three or four on each side of each jaw. The dorsal and pectoral fins are of equal length, and shorter in proportion than in most species. The blow-hole is single, of a half-oval form, the convex part being turned forwards. The colour is black above, whitish beneath, and the separation of the two colours is not abrupt.

The history, and in some measure the description of this animal, is still deficient. It is probably a very rare, or a very local species, and may be expected to be chiefly confined to the Northern seas.

The name *Nisarnak* is from the Norwegian *Nise*, a Porpoise, but with what adjunct I am not acquainted. Thus, too, the Porpoise is in Shetland called *Nisack*, which is a diminutive of the same word.

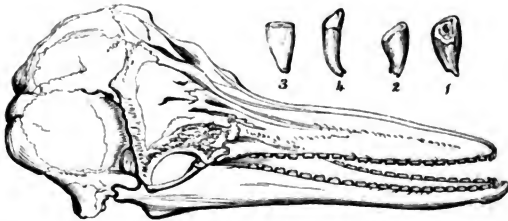
After the most careful examination, I have, with Mr. Jenyns,* admitted the *Delphinus truncatus* of Montagu† as a synonym of this species, though with some slight doubt. The individual which formed the subject of Montagu's paper was taken in the river Dart in Devonshire, about five miles from the mouth of the river. It was killed with difficulty; the poor animal having suffered the attacks of eight men armed with spears and guns, and assisted by Dogs, for four hours. When wounded, it made a noise like the bellowing of a Bull. It was twelve feet long, and about eight feet in circumference at the largest part. The colour of the back was black with a purplish tinge, becoming dusky on the sides, and dirty white on the belly. The blow-hole was crescentic, with the convexity directed forwards; its distance from the point of the snout being fourteen inches and a half. The teeth are described as having been numerous;—from the number of sockets, probably twenty on each side of the upper, and twenty-three of the lower jaw;—and they were so much worn down as to meet upon their truncated surfaces, and to be nearly even with the gums; the space between the teeth was also very small,—so much so, according to Montagu, as to prevent those of one jaw from closing between those of the other. This, however, is probably only the case when they are shortened by abrasion, as the points of the teeth before they were worn down would, from their conical shape, occupy a less interval between the opposite ones. The restoration of the teeth in Montagu's figure is wholly gratuitous; as he only possessed a few of them, and

* Brit. Vert. p. 41.

† Mem. Wern. Soc. III. p. 75, t. iii.

those apart from the cranium. The lower jaw projected a little beyond the upper. The original figures are copied in the vignette below on a reduced scale. It is an interesting fact, that Shaw's figure of the Common Dolphin was referred to by Mr. Cornish, Montagu's informant, as affording a good representation of the contour of the animal ;—a circumstance which, combined with the colour, form, and proportions above stated, agrees in a very satisfactory manner with the descriptions of the present species.

The name of "Blunt-toothed Dolphin," which has been given to this species, is founded upon an error arising from the examination of crania in which the teeth have been worn down by use ; in two skulls in my own collection they are quite acute.



CETACEA.

DELPHINIDÆ.



Genus, PHOCÆNA.

PORPOISE.

Generic Character.—Both jaws with numerous simple and equal teeth ; head obtuse, not beaked ; a dorsal fin.

COMMON PORPOISE.

PORPESSE. SEA-HOG. HOG-FISH.

Phocæna communis.

Specific Character.—Under jaw slightly projecting beyond the upper ; teeth twenty-two to twenty-five on each side of each jaw, nearly straight, and slightly compressed.

Delphinus Phocæna, LINN. Syst. Nat. I. p. 108, n. 1. MULL. Zool. Dan. Prod. p. 7, n. 54. ERXLEB. Syst. p. 618, n. 1. LACEP. Cet. p. 287, t. xx. f. 2. (scelet.) DESMAR. Mammal. p. 516, sp. 770. FLEM. Brit. An. p. 33. JENYNS, Brit. Vert. p. 41.

Phocæna communis, LESSON, Man. Mammal. p. 413, sp. 1078. FR. CUVIER, Hist. Nat. Cétac. p. 171.

Marsonin, CUV. Menag. Mus. (Icon.)—Règ. An. I. p.

Porpesse, PENN. Brit. Zool. III. p. 69. SHAW, Gen. Zool. II. p. 504, t. ccxxix.

THE PORPOISE is the most common of the Cetacea of our seas. It is gregarious, making its appearance in herds of various numbers, playing and tumbling with an agility which rivals that of the Dolphin. Every one who has resided long by the sea-side, at almost any part of the coast, is familiar with the rude, unwieldy gambols in which they in-

dulge, pursuing each other in sport, or diving and swimming with great force and vivacity after their prey. On the approach of a storm, or even in the midst of the tempest, they appear to revel in the waves, showing their black backs above the surface, and often throwing themselves wholly out of the water in their vigorous leaps. The Porpoise is found in various latitudes, from the Mediterranean to the icy seas of the North; but there is every reason to believe that it is to a certain degree migratory, as Fabricius states that it is found in the greatest abundance in Greenland in the summer season, whilst it certainly frequents our coasts more particularly late in the autumn and in the spring. On the western coasts of Ireland, and amongst the Western Islands of Scotland, they abound in multitudes. In the latter locality they are often caught both for the sake of their oil and for food. They often ascend our rivers in pursuit of fish, having been not unfrequently seen high up in the Thames, even above London Bridge. An event of this kind which occurred in the river at Wareham in Dorsetshire gave rise to some interesting notes of the habits of the species, for the following relation of which I am indebted to my friend and relative Dr. Thomas Bell Salter, of Poole.

About twenty years since, towards the close of the year, two Porpoises having wandered into the Wareham river, were driven up the river without difficulty, as they made no attempt to pass the boats. They were taken from the water and cut up for their oil, of which the two yielded sixteen gallons. One of them was found to have milk, which some gentlemen tasted, and found it to be salt and fishy. About the same season three years afterwards, three others were in like manner driven up the river to the town of Wareham: they were full-grown animals, all about the same size. A fence was put across the river above and below them, in

order to retain them for exhibition ; but they plunged so violently, and their cries—which they continued during the night as well as in the day—were so distressing, that after the third day of their captivity, they were, like the former ones, taken from the water and cut up. One of these was found to contain a young one.

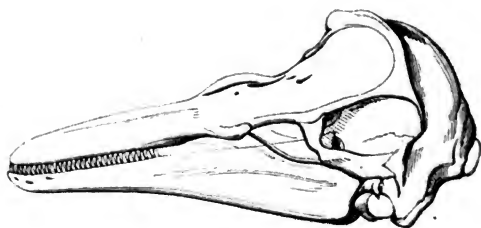
The period of gestation is stated by Anderson to be six months. Mr. Jenyns relates that a specimen which occurred in the London market in May 1833 was found to contain a full-formed young one ; from which that gentleman concludes that they produce their young about that period of the year. In the instance just given, however, from Dr. Salter's statement, a similar circumstance occurred towards the end of the year ; and this period, if Anderson's account of the time of gestation be correct, accords more exactly with other circumstances recorded of their habits. Further observations are yet necessary to decide this point satisfactorily.

The name Porpoise is from the French *Porc-poisson* ; and names of a similar signification are applied to it in several other languages. Thus it is *Marsouin* in French, which is almost exactly the Gothic *Marsuin* ; *Meerschwein* in the German, and Hog-fish in English. The Rev. Thomas Barclay, the learned minister of Lerwick in Zetland, informs me that the native name there is *Nisack*, the diminutive of the Norwegian *Nise*. “ The primary signification of the Norwegian name,” continues Mr. Barclay, “ is a goblin ; and certainly a Porpoise in the act of tumbling on the sea is no bad personification of a goblin.”

The body is fusiform, its greatest diameter being near the situation of the dorsal fin. The head is rounded and obtuse anteriorly, without a beak ; the opening of the mouth is moderately long, and the lower jaw is very little longer than the upper. The teeth are from twenty to twenty-five on

each side, above and below, and differ in their form from those of the Dolphin, and indeed from most, if not all other Cetacea. Instead of being conical, they are compressed, enlarged, and rounded at the apex, having a sort of contracted neck. The eye is rather small, and the pupil in the form of a V. The blow-hole is situated exactly over the eyes, and of the form of a crescent, the horns of which are directed forwards. The whole of the fins are of moderate size, the dorsal fin being obtusely triangular, with the anterior side a little convex, and the posterior slightly concave. The colour of the upper parts is dusky or blackish, becoming gradually lighter on the sides and passing into nearly white on the belly. The pectoral fins are brownish.

The total length of the Porpoise is from four to eight feet. In an individual of four feet long, according to M. Fréd. Cuvier, the distance from the snout to the eye was five inches, and about the same from the snout to the blow-hole. From the extremity of the lower jaw to the pectoral fin was about fifteen inches; the length of that fin, seven inches. From the snout to the middle of the dorsal fin was twenty-seven, and the height of that fin, only three inches and six lines. The breadth of the caudal fin was about five inches.



CETACEA.

DELPHINIDÆ.



THE GRAMPUS.

Phocæna orca. F. Cuv.

Specific Character.—Head obtuse, rounded, not truncated; upper jaw projecting a little beyond the under; teeth about eleven on each side above and below, conical; dorsal fin very high; pectoral fins broad and oval.

Delphinus Orca, FABR. FAUN. Gröenland. p. 46, no. 28. MULL. Zool. Dan. Prod. p. 8, no. 57. ERXLEB. Syst. p. 625. LACEP. Cét. (ed. in 8vo. p. 356.) FLEM. Brit. Anim. p. 34. JENYNS, Brit. Vert. p. 42.

„ *Grampus*, DESMAR. Mammal. p. 517, sp. 774.

„ *Gladiator*, LACEP. l. c. p. 361.

Phocæna Orca, FR. CUV. Hist. Nat. Cét. p. 177.

Grampus, HUNTER, Phil. Trans. 1787, t. xvi. PENNANT, Brit. Zool. III. SHAW, Gen. Zool. II. p. 513, t. ccxxxii.

THE application of the name *Orca* to this species is scarcely supported by the few and meagre facts recorded by ancient writers of the animal known to them by that name. The description given by Pliny of the capture of an *Orca* at the port of Ostia, a few miles from Rome, in the presence of the Emperor Claudius, in which one of the boats* filled and sank in consequence of the commotion produced by the blowing of the animal, would imply that the story referred to

* Quorum unum mergi vidimus, reflatu belluæ oppletum unda. Plin Hist. Nat. l. IX. c. vi.

a Cachalot rather than a Grampus, as the Cuviers have both remarked. The opinion of the same distinguished naturalists that the *Aries marinus* of Pliny is identical with the present species, is perhaps a probable conjecture, from the statement that these Sea-Rams have the horns represented by a white mark only,* which may perhaps answer to the white spot above the eyes in the Grampus. Ælian gives the same account of the Sea-Rams found between Corsica and Sardinia ;† but here some doubt is thrown upon the question by the fact that the Grampus has never in modern times been seen in the Mediterranean.

Even since the introduction of a more rigid mode of investigation, and the diffusion of more correct notions of the characters of animals, there has been considerable confusion in the synonyms of this and approximate species. These have been satisfactorily investigated by M. Fréd Cuvier, and I need only refer the practised naturalist to his work, and to the short table of synonyms prefixed to this description.

Many fabulous or exaggerated stories have been universally propagated respecting the Grampus. It has been considered as not only the most formidable enemy of the larger Whales, attacking them in numerous bands with the utmost fury, and worrying them even to death, but it has been accused of pursuing the Common Whale for a purpose which would indicate a gastronomic taste worthy of Heliogabalus himself. It is said to harass its huge victim till in its terror and agony it opens its mouth ; when the fell Grampus darts upon the tongue, and tears and devours the delicious morsel.

The truth appears to be, as far as credible testimony can be obtained, that the Grampus is extremely voracious, fol-

* Candore tantum cornibus assimilatis.—Plin. Hist. Nat. l. IX. c. v.

† *Marinus aries frontem sic albâ vittâ redimitam habet.*—Æl. Hist. An. l. XV. c. ii.

lowing the shoals of various species of fish, and devouring great numbers of them ; and from its great size, and the astonishing rapidity of its course, pursuing and preying even upon the smaller species of Cetacea,—for Hunter found a portion of a Porpoise in the stomach of one which he examined. They associate at times in small companies of six or eight, but are less gregarious than most others of the family.

They frequent the northern latitudes in great numbers, and, as I am informed by Mr. Barclay, are frequently met with about the northern islands of Scotland, following boats either under sail or with oars : hence they are an object of terror to the Shetland fishermen, though my informant states that he never heard of their having injured a boat or its navigators. Dr. Fleming states, that “ in the Frith of Tay it goes nearly as far up as the salt-water reaches, almost every tide at flood, during the months of July and August, in pursuit of salmon, of which it devours great numbers.” It is even occasionally seen on the more southern parts of our coasts, and has several times been seen and captured in the Thames. An account, with a very characteristic figure, of one which was taken in Lynn harbour, is given in the fifth volume of Loudon’s Magazine of Natural History. The animal, which was a male, was discovered by some fishermen on the 19th of November 1830, with his dorsal fin rising just above the surface of the water. He was driven into the shallows, and tardily despatched by means of knives and sharpened oars. The groans of the poor animal are represented as having been most horrible. Its weight was about three and a half tons, and its total length twenty-one feet following the curve of the back, and nineteen in a straight line. The cranium was procured, and most kindly presented to me by my friend Dr. Laird, and is now in my possession.

Lacépède relates the following circumstance of the *Delphinus gladiator*, which is undoubtedly identical with the *Grampus*:—Sir Joseph Banks sent to that distinguished naturalist some notes of the capture of an animal of this species which occurred in the Thames in 1793. Struck by three harpoons, he rushed off with the boat in which were the persons who had struck him, towed it twice to Greenwich, and once as far as Deptford, against a strong tide running eight miles an hour, and notwithstanding the repeated pike wounds which he received whenever he appeared above water. It was killed opposite Greenwich Hospital; and its expiring struggles were so violent that no boat dared to approach it. It was a very large one, being no less than thirty-one feet in length, and twelve in circumference.

“Grampus,” says the Rev. Mr. Barclay in his communication to me on the Mammalia of Zetland, “is Saxon *Hran-fisk*, which signifies the ‘Grunting Fish,’ from the Gothic *hrina*, ‘to grunt.’” I cannot, however, help thinking that the more obvious and probable etymology is the French *Grand poisson*, as *Porpus* is from *Porc poisson*.

The body of this large species is thicker in proportion than that of most others of the family; it is fusiform, but more tapering towards the tail; the head is obtuse and evenly rounded, passing gradually off towards the snout, which is not truncated as in some species, though more blunt than in the Common Porpoise; the upper jaw projects a little beyond the lower: the teeth are about forty-four in number, there being eleven on each side, both above and below; they are conical and slightly recurved, and the anterior ones are found to become worn down much earlier than the others. The eye is rather small, and is placed five inches above and as much behind the corner of the mouth. The external passage of the ear is about the size of a pea. The blow-hole

is lunate, with the horns turned forwards. The dorsal fin is very long, being more than one-fifth of the total length of the animal; it is a little curved backwards, and somewhat obtuse: the pectoral fins are broad and oval; the caudal fin is very broad, being more than one-third the total length of the animal, and is divided in the middle by a deep notch. The colour is a fine glossy black above, and pure white beneath; there is a white spot above each eye, and in some individuals a large white mark on the sides, which in others is joined to the white ground of the under parts. In the specimen before alluded to which was killed on the Norfolk coast, there was also a saddle-mark of a grey colour.

The following are the dimensions of the individual just named:—

	Ft.	In.
Total length, following the curve of the back . . .	21	3
„ „ in a straight line . . .	19	0
From the snout to the dorsal fin . . .	8	2
From the posterior edge of the dorsal fin to the division of the tail . . .	10	9
Base of the dorsal fin . . .	2	4
Height of „ „ . . .	4	0
Length of the pectoral fin . . .	4	0
Breadth of „ „ . . .	2	8
Circumference of the body . . .	14	0

It may not be irrelevant here to advert to the figure given by Hunter in his paper on Cetacea in the Philosophical Transactions for 1787, as of “another species of Grampus;” upon which was founded the species *Delphinus ventricosus*, by Lacépède. This naturalist was followed by most other writers, and by Fréd. Cuvier with an expression of doubt. But G. Cuvier, and the author of the volume on Whales of Sir William Jardine’s Naturalist’s Library, consider it as a variety of the Grampus;—an opinion for which there is not

the shadow of ground in the shape, proportions, or marking of the figure. It has happened, however, that my friend Mr. Owen has lately found amongst the Hunterian collection of drawings the original drawing by W. Bell, from which the engraving in question was taken, and in this the animal is called "Porpus." Any one examining the engraving, and more particularly the original drawing, which is exceedingly beautiful, must confess that it is an admirable portrait of the Common Porpoise; and there can be no doubt that Hunter at the moment when he applied the name of *Grampus* to it, did so from mere forgetfulness. The *Delphinus ventricosus* of Lacépède, and the *Phocæna ventricosa* of Lesson, and others, are therefore synonyms merely of the *Phocæna communis*.



CETACEA.

DELPHINIDÆ.



ROUND-HEADED PORPOISE.

CABBING WHALE.

Phocaena melas.

Specific Character.—Top of the head very convex and rounded; teeth conical, few in number; pectoral fins very long and narrow.

Delphinus melas, TRAILL in Nichols. Journ. XXII. p. 81, t. iii. FLEM.
Brit. An. p. 24. JENYNS, Brit. Vert. p. 42.

„ *globiceps*, CUV. in An. du Mus. XIX. p. 14, t. i. f. 2. DESMAR.
Mammal. p. 519, sp. 777.

„ *deductor*, SCORESBY, Arct. Reg. I. p. 496, t. xxiii. f. 1.

Phocaena globiceps, LESSON, Man. Mammal. p. 416, sp. 1087. F. CUV. Hist.
Nat. Cét. p. 190.

Globicephalus deductor, JARDINE, Nat. Libr. (Whales), p. 212, t. xvii.

OUR knowledge of the habits of many of the Cetaceous animals is so meagre, and our opportunities of observing them are so rare and imperfect, that it is often difficult to seize upon any facts of sufficient interest or importance to enliven the dry detail of formal description. Such, however, is not the case with the present remarkable species, which, from the sociability of its habits, its strong instinct of attachment, and a tendency to imitation, which not only influences it in the

pursuit of its prey, but often hurries whole troops into the power of its most destructive enemy, becomes an object of interest both to the naturalist, and to the investigator of psychological science.

The Caaing Whale, as it is called in Zetland, is one of the most numerous species of the gregarious Cetacea. Herds of two or three hundred of them are of not unfrequent occurrence; and they sometimes amount to the astonishing number of more than a thousand. This extraordinary tendency to association leads frequently to the capture of the whole herd; for no sooner is one individual driven on shore, than the rest of the herd rush with a blind impetuosity towards the spot, and throw themselves forwards with such violence that they are stranded on the beach, and become an easy prey to their pursuers. They are thus an important object of pursuit to the inhabitants of the Orkneys, of the Shetland and Feroe islands, and of Iceland, who procure from them an abundant supply of good oil.

On the appearance, therefore, of a shoal of these Whales, the whole fishing squadron of the neighbourhood is put into requisition. The sailors endeavour to get to seaward of their victims, and gradually closing upon them, drive them onwards like a flock of Sheep, and urge them by shouts and missiles towards the shore; when one of them, some say a leader, being forced on the beach, the curious scene of self-immolation, which has just been mentioned, is acted by the whole herd. They are then attacked by the entire population, who despatch them by various means; and the cries and dying struggles of the poor animals, some in and some out of the water, the shouts and exertions of the men, and the troubled and bloody sea, combine to form a scene of no trifling interest and excitement.

Dr. Traill, in his most interesting account of these animals, says that they seem to follow a leader with blind confidence;

and hence the efforts of their pursuers are generally directed to guiding the leaders on shore, as they are then morally sure of the whole herd. From some facts, however, there is reason to believe that the cries of distress uttered by the first victims attract the others to their rescue, and that their powerful instinct of attachment becomes thus the cause of their destruction.

The largest number of which I have seen any record, is stated to have come on shore at Hvalfjord in Iceland, in the year 1809—10: this shoal consisted of eleven hundred and ten, which were all captured. The Rev. Mr. Barclay, of whose kind communications I have before had occasion to avail myself, informs me that, three years ago, a shoal of seven hundred and eighty was captured near the residence of my friend John Bruce, Esq. of Sumburgh in Zetland.

It feeds, says Mr. Barclay, on cod, ling, and other large fish; but its favourite food seems to be the cuttle-fish, of which great quantities are generally found in the stomach. The observations of Mr. Watson on the individuals of which Dr. Traill has given the history, show that the females were suckling young ones of four feet and a half long in the month of December: and from other observations on some which were taken on the coast of France, it appears that lactation still continued early in January, when the young were about seven feet long. From these circumstances it is probable that the period of bringing forth the young is about the latter end of summer; and as in the stomachs of the last-mentioned young ones there were found the remains of *sepia* mixed with milk, there is reason to conclude that lactation ceases shortly after the time at which they were observed, or towards the latter end of winter. The teats resemble those of the Cow; and it was found that milk could be readily made to flow from them by pressure, as long as the animals were living.

The Zetlanders give it the name of the "Caain' Whale," generally considered by authors as indicating "calling" or "leading" Whale, whence Scoresby gave it the name of *deductor*; but Mr. Barclay assures me that the real meaning of the word is "driving."

The general form of the animal is rather elongated, and tapering towards the tail: its total length is from sixteen to twenty-four feet, the average being about twenty feet. Its greatest thickness is at the origin of the dorsal fin, where its circumference is rather more than ten feet. The skin is beautifully smooth, and shining "like oiled silk." The head is of an extraordinary form, very short and rounded, and the forehead prominent; the jaws are also very short, the upper projecting a little beyond the lower, and the anterior part of the mouth is covered with a thick fleshy upper lip. The number of the teeth, as in many of the Cetacea, varies considerably, being found even in adults from eighteen to twenty-six in each jaw; they are conical, slightly curved inwards at the point, and do not project more than about an inch from the gum, those towards the middle being the longest. The palate is furnished with transverse rugæ, as in ruminant animals. The eyes are extremely small, and of a bluish colour; the external opening of the ear is not perceptible; the blow-hole is single, placed in a hollow towards the back of the head, of a crescent shape, the horns being directed forwards. The dorsal fin,* which is placed about the middle of the body, is about four feet long and fifteen inches high; the pectoral fins are distinguished by their narrow and elongated form, in which respect they exceed those of any other known Cetaceous animal, being five feet two inches in length, and only one foot six inches in breadth; they are curved backwards, and taper towards the extremity. The caudal fin extends to about five feet, and is deeply divided at the middle.

* These dimensions are taken from the work of Fred. Cuvier.

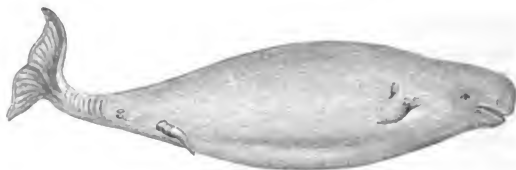
The colour of the whole animal is a rich deep black, excepting a white mark which originates in a heart-shaped form under the throat, and extends backwards along the breast and belly.

The specific name *melas* was assigned to this species by Dr. Traill in the year 1809 ; and Cuvier, not being acquainted with Dr. Traill's paper, named it *globiceps* in 1812 ; Scoresby, as late as 1820, gave it the name *deductor* ; and I have thought proper, with Mr. Jenyns, to restore to it the original appellation.



CETACEA.

DELPHINIDÆ.

Genus, *Beluga*. Less.

Generic Character.—Head obtuse and broad; snout not produced; no dorsal fin.

WHITE BELUGA.

WHITE WHALE. WHITE FISH.

Beluga leucas.

Specific Character.—Head blunt; teeth about eight or nine on each side above and below, short and obtuse; general colour whitish.

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|--------------------------------|---|
| <i>Delphinus leucas</i> , | PALL. Reise, III. p. 92, t. lxxiv. DESMAR. Mammal. p. 519, sp. 779. |
| „ <i>albicans</i> , | FABR. Faun. Groënland, p. 50. JENYNS, Brit. Vert. p. 43. |
| <i>Delphinapterus Beluga</i> , | LACEP. Cét. p. 243. |
| „ <i>leucas</i> , | GERARD, Dict. des Sc. Nat. VI. p. 65. |
| „ <i>albicans</i> , | FLEM. Brit. An. p. 36. |
| <i>Phocæna leucas</i> , | F. CUV. Cét. p. 199. |
| <i>Balæna albicans</i> , | KLEIN, Misc. II. p. 12. |
| <i>Beluga borealis</i> , | LESSON. |
| „ | BARCLAY & NEIL in Mem. Wern. Soc. III. p. 371, t. xvii. SHAW, Gen. Zool. II. p. 515, t. ccxxxii, SCORESBY, Arct. Reg. I. p. 500, t. xiv. JARDINE, Nat. Libr. (Whales), p. 204, t. xv. |

THE generic distinction of the Beluga from Delphinaptera, which has recently been made by M. Lesson, appears to me

to be well founded. The former, in fact, bears the same relation to the latter form, as the blunt-headed genus *Phocaena* — especially that section of it to which the Caaing Whale belongs — does to the long and depressed beaked *Delphinus*. These analogies are so striking and exact, that it is impossible to allow of the generic separation of the two latter, without also requiring that of the former: I have, therefore, adopted M. Lesson's distinction, retaining, however, the oldest specific name. A comparison of the crania fully supports this view of their relations: and in proof of this, I beg to refer those who have not the opportunity of consulting actual specimens, to the accurate figures of the crania of Cetacea in the fifth volume of the "Ossemens Fossiles" of Cuvier, and to those which form the tail-pieces to the species in the present work.

The Beluga has long been known under various names, all signifying "White Fish," or "White Whale." Its clear white colour, sometimes slightly tinged with yellowish or rose colour, renders it the most beautiful of the whole order; and its proportions are admirably adapted for the rapid and graceful movements for which it is remarkable. The skin, thus delicate in its colour, is so soft that it is often torn by the harpoon as the animal struggles to get free.

Like most of the *Delphinidae*, it is gregarious; sporting, feeding and migrating in herds of moderate numbers, and often following and surrounding boats, like the Common Dolphin. It must be a beautiful and interesting sight to witness a number of these elegant creatures leaping and enjoying themselves in the midst of a calm dark sea, pursuing each other in their active gambols, or diving after their prey, and reascending to the surface for sport or respiration, and throwing jets of water from their spiracles to a great height.

The female ordinarily brings two young ones in the spring, which she tends with the greatest care and solicitude:

they follow her in all her movements, and do not quit her until they are of considerable size. When young, it is of a bluish grey colour; and the change to pure white, which does not take place till it is about two-thirds grown, commences on the belly, and gradually advances upwards.

Its food consists of various kinds of fish, in search or pursuit of which it frequents the mouths of rivers, and often ascends them to a considerable distance. Its flesh is eaten by the inhabitants of the most northern coasts, and is said by Giesecke to be red like beef, and by Egede to be equal to pork. Pallas says, however, that its flesh is black. It is hunted principally for its oil, which is of excellent quality. It is taken by harpoons, strong nets, or even by hooks baited with fish. The skin, although somewhat soft in its natural state, forms a very useful leather, which is at once flexible and tough.

The Beluga is confined to northern latitudes, and is to be considered as one of the rarest visitants of our coasts. The individual described by Dr. Barclay and Mr. Neil in the *Wernerian Memoirs* was taken in the summer of 1815, in the Frith of Forth, where it had been observed for nearly three months ascending with the flood tide, and again retreating with its ebb.

In form the body of the Beluga is beautifully adapted to rapid natation, presenting a double cone, of which the posterior part is the longest. The head is small, the snout blunt, the gape narrow, and the upper jaw a little overhangs the lower. The teeth vary in number in different individuals; but it is probable that the normal number is nine on each side of each jaw, as stated by Fabricius, Lacépède, and Cuvier. In a cranium in my possession, from which the vignette is taken, there are eight in the upper and six in the lower jaw on each side; but it is evident that two have fallen from the former, so that there must have been ten

originally. Old individuals are often found without any teeth in the upper jaw. The pectoral fins are rather short, thick, and oval: there is no dorsal fin; and that of the tail is very broad and powerful.

The dimensions of the specimen described by Dr. Barclay and Mr. Neil are as follows:—

	Ft.	In.
Total length in a straight line . . .	13	4
„ „ following the curve of the back . . .	14	5
Length of the pectoral fin along its exterior margin . . .	2	0
Greatest breadth of ditto	1	1
Breadth at its connexion with the body	0	6½
Circumference of the body at the thickest part immediately behind the pectoral fins	8	11
Breadth of the tail	3	0½



CETACEA.

DELPHINIDÆ.

Genus, *Hyperoodon*.

Generic Character.—Snout produced, depressed; forehead much elevated; teeth two only, in the anterior part of the lower jaw; palate studded with tubercles; a dorsal fin.

BOTTLE-HEAD.

Hyperoodon Butzkopf. Lacép.

Hyperoodon Butzkopf, LACEP. Cét. p. 319. F. CUV. Cét. p. 241.

Delphinus Hyperoodon, DESMAR. Mammal. p. 521, sp. 784.

„ *bidentatus*, „ Nouv. Dict. IX. p. 175.

„ *bidens*, SCHREB. t. cccxvi. SHAW, Gen. Zool. II. p. 514.

Hyperoodon bidens, FLEM. Brit. An. p. 36. JENYNS, Brit. Vert. p. 44.

Balæna rostrata, CHEMNITZ (non Fabr.).

Bottle-head, DALE, Hist. of Harwich, p. 411, t. xiv.

Bottle-nose, HUNTER, Phil. Trans. 1787, t. xix.

IN the year 1787, the “Bottled-nosed Whale with two teeth” was figured in the Philosophical Transactions by Hunter, as one of the illustrations of his elaborate paper on the Anatomy of Cetaceous Animals. The figure, which is repeated above on a reduced scale, was accompanied by a short and unsatisfactory account of the animal. He states that it was twenty-one feet long, resembling the *Delphinus tursio*, “but of a different genus, having only two teeth in the

lower jaw, concealed by the gum." The belly was white, shaded off into the dark colour of the back. He considered it as the species described by Dale, and supposed it to have been a young one, as he mentions a skull of the same kind which must have belonged to one thirty or forty feet long. It was caught above London Bridge, having wandered up the Thames.

The specimen referred to by Hunter, as described by Dale* under the name of "Bottle-head, or Flounder's-head Whale," was from the extremity of the beak to that of the tail, fourteen feet; the circumference, seven feet and a half; the pectoral fins, seventeen inches in length, three feet from the end of the beak, and three feet nine inches anterior to the cloaca: the dorsal fin, which was one foot long, was distant five feet from the extremity of the tail. "The head," says Dale, was like that of a Dolphin; only the bill or snout was not half so long, and in the mouth no teeth." It was taken at Maldon, having been left by the tide. The following is a reduced copy of Dale's figure.



These are the documents upon which alone we have to

* Silas Taylor's History and Antiquities of Harwich, p. 411, t. xiv.

depend as to the occurrence of the Hyperoodon upon the British shores ; but there are several traces, more or less distinct, of its having been seen on various parts of the northern and eastern coasts of Europe. The most important, because the most detailed, is that of Baussard, who described and figured, in the *Journal de Physique* for 1789, a female Whale with her young, which had been stranded at Honfleur. The adult was twenty-three feet six inches in length ; the snout was short, and the forehead rose abruptly from it to the height of eighteen inches above the jaws ; the lower jaw was furnished with two pointed teeth in the anterior part, which were not visible until the soft parts were removed, and they were very moveable in the alveoli. The palate and upper jaw were furnished with little hard or sharp points or tubercles, rather more than half a line in height. The spiracle, of a crescentic form, with the horns directed backwards, was four feet four inches from the extremity of the snout. The pectoral fins were two feet long, and one foot three inches broad. The dorsal, two feet long at its base, and one foot three inches high. The tail was six feet ten inches broad. The colour of the animal was black above, and plumbeous beneath.

Passing the imperfect traces of its existence as afforded by Chemnitz and some other writers, there remains another account* of its occurrence, from which some additional detailed and sure information respecting its form and proportions may be obtained. It refers to a female Hyperoodon which was taken in the harbour of Kiel in December 1801 ; a coloured figure of which, accompanied by a succinct description, was published there at the time by a M. C. D. Voigts, an engraver. The animal was twenty-six feet in length, and thirteen in circumference at the

* Fr. Cuv. Hist. Nat. des Cét. p. 244.

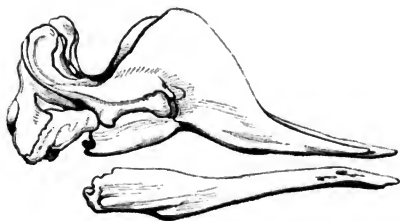
middle of the body. The snout was one foot nine inches long, and one foot broad. From the extremity of the snout to the eye, which was placed immediately under the blow-hole, four feet two inches : from the blow-hole to the back fin, twelve feet ; this fin was one foot eight inches long, and one foot four inches high : from this to the origin of the tail was seven feet six inches ; and the tail was six feet two inches broad : the pectoral fins were two feet eight inches long, and eight inches broad. The general colour was a blackish grey, becoming brighter beneath the belly and around the eyes, and the upper part of the snout was mottled with yellowish white. There were no teeth perceptible in either jaw.

I have thought it necessary to give these details from the different authors who have described this rare species, in order to enable British naturalists, to whom the good fortune may occur of examining any of the rarer species of our Whales, to ascertain their relation to those which have already been described.

With regard to the question of the specific identity of all the individuals which have been above alluded to, there appears to be little doubt, excepting perhaps with respect to that recorded by Dale. The contour of his figure is certainly very different from that of Hunter, and from all the descriptions. This may, however, possibly have arisen from enlargement of the body by putrefaction, assisted by the inaccuracy of the draughtsman. I cannot agree with Mr. Jenyns in considering the Whale described by Sowerby as belonging to this species, as it appears scarcely possible that the form of the head could have been so erroneously drawn by so accurate an artist, particularly as he distinctly alludes to the peculiarity of this part.

I conclude this meagre account of a most interesting animal by a reference to the character of the cranium,—a figure

of which, from the splendid skeleton in the Museum of the Royal College of Surgeons, forms the vignette. Exclusive of the peculiarity of its general form, the large and remarkable bony crest rising over each superior maxillary bone constitutes a character which cannot be mistaken. Its general structure is also very interesting, as indicating a marked approach to that of the *Balanidæ*, or true Whales.



CETACEA.

DELPHINIDÆ.

Genus, *Diodon*. Lesson.

Generic Character.—Head depressed; snout depressed, narrow and elongated; the upper jaw shorter and narrower than the under; teeth two in the lower jaw only, placed about the middle on each side.

SOWERBY'S WHALE.

Diodon Sowerbai.

- Physeter bidens*, SOWERBY, Brit. Misc. p. 1, t. i.
Delphinus Sowerbyi, DESMAR. Mammal. p. 521, sp. 785.
Heterodon Sowerbyi, LESSON, Man. Mammal. p. 419, sp. 1097.
Diodon Sowerbi, Id. JARDINE, Nat. Lib. (Whales), p. 192, t. xii.

THE occurrence of one specimen only of this remarkable and beautiful species has hitherto been recorded; and this was figured and described by the late Mr. Sowerby in the British Miscellany, of which work it forms the first subject. As this, therefore, is the only source of information respecting it, I copy all the essential parts of the description from that account.

“For this animal I am indebted to that zealous promoter of natural history, James Brodie, Esq. by whom it was observed, cast on his own estate, near Brodie House, Elgin-

shire. On account of its weight and bulk, he sent me only the head,—a sufficient mark to distinguish it from all others of this genus (*Physeter*), and to serve as a specimen for my museum. I was much pleased and astonished when I found, from the extraordinary formation of its mouth and the situation of its teeth, that it was likely to prove a species not yet described.

“Mr. Brodie, who assisted me with the sketch and description of the rest of the animal, observes that the cuticle on every part of the head and body was perfectly pellucid and satiny, reflecting the sun to a great distance. Immediately under the cuticle, the sides were completely covered with white vermicular streaks in every direction, which, at a little distance, appeared like irregular cuts with a sharp instrument. It was a male animal.—The animal is oblong; black above, nearly white below; sixteen feet long,—eleven in circumference at the thickest part, with one fin on the back: head acuminate; lower jaw blunt, longer than the upper, with two short, lateral, bony teeth: upper jaw sharp, let into the lower one by two lateral impressions corresponding with the teeth: opening of the mouth, one foot six inches. Under the throat are found two diverging furrows, terminating below the eyes; which are small, and placed six inches behind the mouth. Spiracles lunate, the ends pointing forwards.”

Such is the brief and only account of an animal which has by many naturalists been mistakenly referred to the same species as Hunter's and Dale's, before described. This opinion, however, is wholly untenable; as the peculiar proportions of the head in the figures of the two species are so exceedingly different, that it is impossible for such a correct and admirable artist to have made so erroneous a representation as this would imply. The head in *Hyperoodon* rises abruptly from the snout, and is very prominent and rounded;

in the present animal it is exceedingly depressed. The difference in the situation of the teeth is also an obvious and important character. Whether the generic distinction of the two be correct appears very doubtful; nor can this and many other similar cases of doubt, as to the value of the form and situation of the teeth as generic characters in the Cetacea, be decided until many more accurate examinations have been made on the subject.



CETACEA.

DELPHINIDÆ.

Genus, *Monodon*.

NARWHAL.

Generic Character.—Teeth two, one generally remaining undeveloped in the jaw ; the other stretching forwards in a line with the body, long, straight, spirally twisted : no dorsal fin.

THE NARWHAL.

SEA UNICORN.

Monodon monoceros. Linn.

Monodon monoceros, LINN. Faun. Suec. II. p. 16, n. 48.—Syst. Nat. I. p. 105, n. 1. MULLER, Zool. Dan. Prod. p. 6, n. 44. ERXLEB. Syst. p. 626, n. 1. DESMAR. Mammal. p. 523, sp. 787. SCORESBY, Arct. Reg. I. p. 486, t. xv. FLEM. Brit. An. p. 37. JENYNS, Brit. Vert. p. 42. F. CUV. Hist. Nat. Cét. p. 230, t. xvii. f. 2, 3.

Narwhalus vulgaris, LACEP. Cét. p. 163.

„ *microcephalus*, IB. l. c. p. 159, t. v. f. 2.

Small-headed Narwal, FLEM. Mem. Wern. Soc. I. p. 131, t. vi.

Unicorn Narwhal, SHAW, Gen. Zool. II. p. 473, t. ccxxv.

IN recounting the history of this remarkable animal, it is unnecessary to enter into any detail of the absurdities with which the earlier accounts of its structure, habits, and powers abounded, or even to dwell upon the mistakes of the too credulous though acute Anderson, or the turgid exaggerations of

Lacépède. The almost miraculous qualities which were attributed to its single tooth, as the reputed horn of the fabled Unicorn, would meet with but little attention in the present age of enlightened investigation ; nor would the impossibilities which were related of the physical power of the animal excite a greater degree of interest. The investigations of two of our countrymen have contributed more than any others to rectify these errors ; and we find in the observations of Scoresby on its habits, and in the detail of its anatomy by Dr. Fleming, the most accurate information hitherto obtained respecting its structure and its manners. In its general form and characters it so much resembles the *Beluga*, with which it also agrees in the absence of a dorsal fin, as to indicate a not very remote relation to that genus. If to this view of its affinity it be objected that the teeth, which constitute so essential a character in most of the groups of Mammalia, differ greatly in the present case, it must, on the other hand, be remembered that they also differ in number and form in many of the Cetacea, which are otherwise closely allied ; and that if the Narwhal be devoid of teeth, with the exception of its tusks, the *Beluga* possesses fewer teeth than any species with which it is usually associated, and that, of the few which it has, the greater number fall out before a very advanced age. In other respects—in the general form of the body, in the obtuse and rounded head, its small gape, its finless back, and especially in the form and structure of the cranium—it approaches very near to the *Beluga*.

The Narwhal inhabits the northern seas, rarely coming so far south as even the northern islands of Scotland. It is a powerful, active creature, swimming with almost incredible swiftness, feeding on molluscous and other soft animals, as the absence of the usual teeth restricts it from taking or eating fish. It is gregarious in its habits, appearing in herds of about six together, but without that playful and almost

affectionate sociability which distinguishes the Common Dolphin, the Caaing Whale, or the Beluga. When the Narwhal is harpooned, it dives with considerable velocity, often to the depth of about two hundred fathoms; and on returning to the surface, is easily killed by the Whale-lance. The blubber, which is usually about three inches in thickness, and amounting to nearly half a ton in weight, encompasses the whole of the body. It furnishes a very large proportion of fine oil.

In most cases one young one only is produced, which is suckled for a considerable time with the greatest care.

To what extent the ascribed power of the tooth may be true, we have but little means of ascertaining; but there is the structural evidence of its form, and its extraordinary development, to indicate that there must be some especial use for so long and sharp and powerful a weapon; and really there seems no reasonable ground for assigning to it any other object than that formerly attributed to it by the ignorant,—namely, that of defence. In this respect it forms, indeed, an additional instance to numerous others, of gregarious animals, to the males of which alone belongs such a development of the teeth or the horns as shall constitute them the natural defenders of the herd. The Elephant, the Wild Boar, and even the Horse, offer examples of the former, and the Antelopes and Deer of the latter; and there can be no doubt that the restriction of this weapon to the males in the Narwhal has a similar object. The usual length of the exerted tooth is about six feet, but it sometimes occurs as much as nine or even ten feet long. The ivory of which it is composed is extremely compact, and of a beautiful white colour. It is spirally twisted from left to right, is quite straight, tapering to a rather obtuse apex, and is hollow from the base to within ten or twelve inches of the point. It would be a strange anomaly were the apparent singleness of this weapon real; but the

truth is, that both the teeth are invariably formed in the jaw, not only of the male, but of the female also,—but that in ordinary cases one only, and this in the former sex, is fully developed, the other remaining in a rudimentary condition, as is the case with both in the female. To what immediate physiological cause this extraordinary development of one tooth at the expense, as it were, of its fellow is to be attributed, it would perhaps be difficult to conjecture. It is found that sometimes it is on the right side, but much more frequently on the left; and the corresponding tooth remains extremely small, or even permanently concealed. There are, however, several instances on record in which both teeth have been exerted to an almost equal extent. It also now and then occurs that in the female the teeth acquire a considerable size. That this does not arise, as in the partial assumption of the male character in the females of some other animals, from ovarian deficiency either from age or disease, is proved by the fact of a female Narwhal thus furnished being found pregnant with two young.* An instance is recorded in which one of this sex had two very long and fully developed tusks, of which that on the left side was seven feet five inches long, and the other seven feet.

The occurrence of this species on the coasts of Great Britain has been but rare. Three instances are recorded; the first by Tulpius in 1648, “prope insulam Mayam.” The second was found on the 15th February 1800, near Boston in Lincolnshire, of which Dr. Fleming says,† “According to information which I received from Sir Joseph Banks in a letter dated the 19th January 1809, ‘the animal when found had buried the whole of its body in the mud of which the beach there is composed, and seemed safely and securely watching the return of the tide. A fisherman, going to his boat, saw the horn, which was covered up, and trying to

* Linn. Trans. XIII. p. 620.

† British Animals, p. 29.

pull it out of the mud, raised the animal, who stirred himself hastily to secure his horn from the attack. The specimen was said to be twenty-two feet long, of which the tooth probably constituted seven." The third, which was taken in 1806, at the sound of Weesdale in Zetland, was the subject of Dr. Fleming's excellent paper in the Memoirs of the Wernerian Society, already referred to.

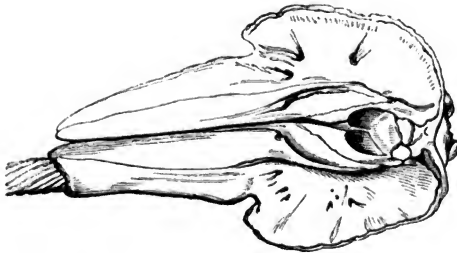
"The word Narwhal," says Mr. Barclay, "is Gothic, and means literally, 'the Beaked Whale,' from Gothic *nar*, Icelandic *ner*, a beak, or projecting snout."

The general form of the body is less thick in proportion than that of the Beluga; the forehead rises rather abruptly from the short snout, the outline then becomes slightly elevated over the blow-hole, after which a slight depression marks the neck. This form is occasioned by a considerable bed of fat, of eight or nine inches in thickness, lying upon the maxillary and intermaxillary bones; and as it differs in comparative thickness in different individuals, the contour of the head varies equally. The first half of the body is nearly cylindrical, the remaining portion to the tail conical. In this latter portion there is a dorsal and ventral low ridge, and less distinctly marked lateral ridges, giving it a subquadrangular form. The pectoral fins are so small as to be scarcely available in swimming; so that the tail, as Scoresby observes, forms the only effective means of progression. There is no dorsal fin, but a small raised ridge seems to indicate its rudimentary condition. The mouth is pointed before, and the upper jaw projects a little beyond the under. The eye is on a cross line with the blow-hole. — The tooth projects through the lip generally on the left side, and is imbedded, not in the intermaxillary bone, as Dr. Fleming states, but in a socket formed partly by this bone, and partly by the true maxillary. As, however, the latter appears to constitute the greater portion of the cylinder, it is probably a modification of the canine tooth, and not of the incisor.

The general colour is a yellowish white, with numerous blackish spots of various size and figure. The pectoral fins are grey, with blackish border. In the young state the spots are less distinct, and frequently confluent; and the ground colour is a blackish grey.

Dimensions of a middle-sized full-grown individual :—

	Ft.	In.
Length of the body exclusive of the tooth	15	0
„ extended tooth	5	6
Circumference of the body behind the fins	8	5
Length of the pectoral fin	1	1
Breadth of ditto	0	3½
„ of the tail	3	1½



CETACEA.

PHYSETERIDÆ.



Genus, *Physeter*.

CACHALOT.

Generic Character.—Head enormously large, truncated in front: perfect teeth in the lower jaw only; in the upper jaw, either wanting, or few and rudimentary.

COMMON CACHALOT.

SPERMACETI WHALE.

Physeter macrocephalus. Linn.

Specific Character.—Back smooth, or with one or more low protuberances.

- Physeter Catodon*, LINN. Syst. Nat. I. p. 107, n. 2. MULL. Zool. Dan. Prod. p. 51.
 „ *macrocephalus*, LINN. Syst. Nat. I. p. 107, n. 2. MULL. Zool. Dan. Prod. p. 7, n. 52. SHAW, Gen. Zool. II. p. 497, t. ccxxviii. JENYNS, Brit. An. p. 44. FR. CUV. Hist. Nat. Cét. p. 286, t. xix. f. 1, 2, 3.
Catodon macrocephalus, LACEP. Cét. p. 165, t. x. f. 1. FLEM. Brit. Anim. p. 39.
C. Trumpo, LACEP. l. c. p. 212, t. x. f. 2.
Blunt-headed Cachalot, PENNANT, Brit. Zool. III. p. 61, t. vi.

AFTER a careful examination of the various accounts which have from time to time been given of Whales belonging to this family, called *Spermaceti Whales*, I have found

it necessary to adopt an opinion in some measure at variance with those of most previous writers, with regard to the genera and species to which all those accounts and details are to be referred. The conclusion to which I have been led is, first, that the high-finned Cachalot is specifically, but not generically, distinct from the common one, and that therefore the genus *Catodon* is to be abolished, and the name of *Physeter* retained for both the species; and secondly, that all the other species which have been distinguished by various naturalists have been founded upon trifling variations, or upon vague and insufficient data.

In the multiplication of species in this family by Bonnatte, Lacépède, and others, they appear to have been principally guided by the existence or absence, or by some slight variation in the form or situation of those dorsal protuberances which exist in the common species, but which never rise beyond a very moderate height; in which respect they differ from the high distinct dorsal fin of the *Physeter Tursio*.

The Baron Cuvier, after a most elaborate and careful investigation of this intricate subject,—the results of which are detailed with his usual clearness in his "*Ossements Fossiles*,"—concludes, indeed, that there is but one species of *Spermaceti* Whale; and his brother adopts this opinion, but with some doubt whether the southern Cachalot may not be distinct. It is unnecessary to enter into any lengthened details of the grounds upon which these distinguished naturalists have come to this conclusion, or to relate the history of former errors. To those who wish to enter into the investigation it will be sufficient to refer to these elaborate treatises; but it has appeared to me that the existence of a high narrow dorsal fin is a sufficient character to constitute a specific distinction; though I should not be disposed upon so slight a ground to form a generic separation between them.

The Common Cachalot, or Spermaceti Whale, is well known as affording that peculiar and useful substance from which it takes its common name. The enormous size of the head, in length very nearly equalling, and in bulk even surpassing, half of the whole animal, is principally dependant upon the immense quantity of spermaceti, which is contained in a thick dense bag, divided into compartments, and placed above the anterior part of the cranium. It is also found along each side of the back, and in some other parts of the body.

When the animal is living, this matter exists in a fluid state; and when the Whale is killed, a hole is made in the outer and upper part of the head, and the liquid baled out with buckets. It solidifies on cooling, and being afterwards refined, assumes that beautifully white crystallised appearance so well known as belonging to the officinal spermaceti. The oil, in the first place, is separated from it by filtration. It is then put into barrels, in the state of a yellow unctuous mass, and is purified by the following process. "The mass is put into hair or woollen bags, and pressed between plates of iron in a screw press, until it becomes hard and brittle. It is then broken into small pieces, and thrown into boiling water, where it melts, and the impurities are separated from it. After being cooled and taken from the first water, it is put into a boiler of clean water, and a weak solution of potash is gradually added. This is thrice repeated, after which the whole is poured into coolers, when the spermaceti concretes into a white semi-crystallised mass, and on being cut into small pieces exhibits the beautiful flaky appearance already mentioned." Another substance of some value is also produced by this animal, called, from its colour and smell, *ambergris*. This is a rather hard brittle matter of a grey colour, having a peculiar odour, for which it is much esteemed by some persons as an agreeable perfume. It is occasionally found in the intestines

of the animal, and is still more frequently collected on the shores of those seas which are frequented by the Cachalot. There appears to be no doubt that this substance is con-creted within the animal; and it is probably occasioned by the occurrence of some hard and indigestible body forming a nucleus for its accretion. This view of its formation is borne out by a curious fact recorded by D. Schwediauer, that the beaks of cuttle-fish were found in every piece of ambergris examined by him; and it is well known that the large Octopus forms by far the principal food of this species of Whale. The same author declares that the existence of these extraneous and indigestible masses often occasions abdominal abscesses, after the bursting of which the ambergris is found floating on the surface of the sea. Ambergris was formerly used in medicine, but is now wholly neglected as being useless and nearly inert.

The dangers which are encountered in the pursuit and destruction both of this species and of the Common Whale, or Mysticete, are truly frightful. It is not merely in the necessary exposure of the hardy and adventurous sailors to the extremity of cold, and the frequent imprisonment of their ships for a whole winter amidst impassable and impenetrable fields of "thick-ribbed ice," that these dangers exist: the immense size and power of the animal itself, and the fury to which he is excited by the wounds of the harpoon, are the cause of the loss of numerous lives. The immense power of the tail is one source of this danger. A single blow with this formidable instrument will dash a boat to pieces, and scatter the unhappy navigators wide on the surface of the ocean; and there is a well-authenticated instance on record of an American ship of large size being stove in and foundered by the blow inflicted by the head of an infuriated male Cachalot of large size. In fact, as Low quaintly says, "all the kind seem to be very mischievous." The details of Mr. Beale, in

his interesting little sketch of the South Sea Whale Fishery, and of the habits of the Southern Cachalot, abound in interest with reference to this as well as many other matters connected with the subject.

The occurrence of this species in the British Seas has been occasionally, but not very frequently, recorded. In the year 1769 an individual ran on shore on Cramond Island in the Frith of Forth, and was there killed. It was fifty-four feet in length, and thirty in circumference. A figure of it, perhaps the best which has ever been given of the animal, was published in the Philosophical Transactions, with an excellent description by Mr. Robertson of Edinburgh. To what species the herd consisting of a hundred and two, stated by Sir Robert Sibbald to have been thrown ashore in Orkney, belonged, is wholly uncertain. Cuvier considers that they were probably Belugas; but for this opinion there is no other ground than the absence of teeth in the upper jaw. According to Low, the present species "is often driven ashore about the Orkneys,—nay, and sometimes caught."

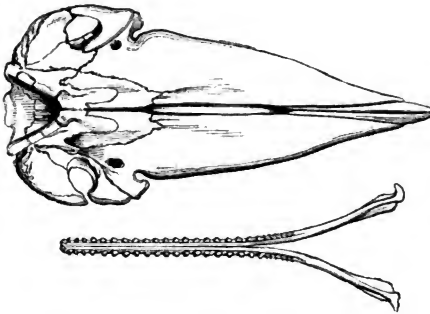
This animal swims with great velocity, often with its snout raised above the surface of the water,—a position which doubtless depends upon the small specific gravity of this part, occasioned by the immense quantity of spermaceti which it contains.

The Cachalot sometimes reaches the length of seventy feet. The head is of enormous size, forming about half of the entire bulk, the body tapering from it to the tail; the snout is truncated in front, the upper part of it having a protuberance, in which is placed the blow-hole, which is single and situated a little on the left side. The upper jaw, which overhangs the lower by about four or five feet, is without visible teeth; but there are a few small and rudimentary ones concealed beneath the gums. The lower jaw is extremely narrow, the two branches being in contact throughout the greater part

of its length, and furnished with about twenty to twenty-five conical and slightly recurved teeth on each side, according to the age of the animal. In a small specimen in my possession the former number occurs. The lower jaw fits into a groove in the upper, in which are hollows to receive the teeth. The principal bulk of the head consists of cavities divided by membranous septa, containing the spermaceti in a fluid state. The eye is small, and placed in the most prominent part of the head; the eyelids furnished with a few stiff hairs. The back is without a fin, but has a distinct protuberance not far from the tail, and sometimes one or two smaller ones. The pectoral fins are small, and slightly grooved longitudinally; the caudal fin very broad, divided at the middle into two equal lobes.

The general colour is greyish black above, lighter beneath.

The vignette is a figure of its cranium, and of the lower jaw.



CETACEA.

PHYSETERIDÆ.

HIGH-FINNED CACHALOT.

Physeter Tursio. Linn.

Specific Character.—Back with a very high narrow fin, and two or three low protuberances.

- Physeter Tursio*, LINN. Syst. Nat. I. p. 107, n. 4. MULL. Zool. Dan. Prod. p. 8. ERXLEB. Syst. p. 615, n. 4. FLEM. Brit. An. p. 38. JENYNS, Brit. Vert. p. 45.
- „ *microps*, LINN. Syst. Nat. I. p. 107, n. 3. MULL. Zool. Dan. Prod. p. 7. ERXLEB. Syst. p. 614, n. 3. LACEP. Cét. p. 227. DESMAR. Mammal. p. 525, sp. 794. FLEM. Brit. An. p. 38.
- „ *orthodon*, LACEP. Cét. p. 256. DESMAR. Mammal. p. 526, sp. 795.
- „ *mular*, LACEP. Cét. p. 259. DESMAR. Mammal. p. 526, sp. 796.
- High-finned Cachalot*, PENN. Brit. Zool. III. p. 64. SHAW, Gen. Zool. II. p. 796.

NOTWITHSTANDING the authority of both the Cuviers, already alluded to, I have, after much consideration, decided on admitting this species as distinct; although we are hitherto without any very satisfactory account of its characters, with the exception of that remarkable one to which it owes its usual English name. Lacépède, indeed, as well as many other writers, enumerates three species of High-finned Cachalots, which he also considers as generically distinct from those which are destitute of a dorsal fin: but these distinctions do not rest upon characters of sufficient importance in themselves, or sufficiently well attested, to sanction such an opinion. The Baron Cuvier, in the work already mentioned,* enters, with his usual critical acumen and judgment,

* Ossements Fossiles, V.

into an elaborate examination of the data upon which the various accounts of all the assumed species rest, and has satisfactorily disposed of most of them; but it appears that he was premature in abolishing the one now under consideration.

The first account of this animal is found in the *Phalainologia* of Sir Robert Sibbald, who expressly states that the dorsal fin was very high and erect, and compares it to the mizen-mast of a vessel;* notwithstanding which, Cuvier, as if determined to cut the knot which could not be untied, repeatedly states his belief that the animal thus described was the Caaing Whale, or *Phocæna melas*. A moment's reference to our figure of the latter species,† will show how utterly improbable it is that any observer should have likened its low obtuse dorsal fin to the mast of a ship.‡ The truth, however, is, that this species is known in our northern islands as distinct from the common species; and my kind correspondent Mr. Barclay, of Zetland,—himself an accomplished naturalist,—informs me that the "*Physeter Tursio*, or High-finned Cachalot, is frequently seen on those coasts in summer, and is easily distinguished by the long perpendicular fin on its back." This communication is of considerable interest, and appears to go far towards setting the question at rest. It is, however, to be lamented, that hitherto there has been no opportunity of obtaining a satisfactory description of the animal, or of ascertaining what other distinctions may exist between the two species; nor is there a figure of this species in existence.

* Habebat autem hæc bellua duas pinnas laterales, et tertiam in medio ferè dorso erectam quam arbori navis comparabat, quæ à nautis "*mizan mast*" dicitur.—Sibb. Phal. Nov. cap. iv. p. 44.

† Page 481.

‡ It is very probable that Sibbald describes the same species in his second chapter: "De Balænâ macrocephalâ, quæ tertiam in dorso pinnam sive spinam habet."

CETACEA.

BALÆNIDÆ.

Genus, *Balæna*.

TRUE WHALE.

Generic Character.—Head very large ; palate furnished with baleen ; teeth none ; no dorsal fin.

COMMON WHALE.

GREENLAND WHALE.

Balæna mysticetus. Linn.

Balæna mysticetus, LINN. Syst. Nat. I. p. 105, n. 1. MULL. Zool. Dan. Prod. p. 6, n. 45. ERXLEB. Syst. p. 601. LACEP. Cét. p. 1, t. i. DESMAR. Mammal. p. 529, sp. 798. SCORESBY, Arct. Reg. I. p. 449, t. xii. f. 1. FLEM. Brit. An. p. 33. JENYNS, Brit. Vert. p. 46. FR. CUV. Cét. p. 324, t. xxi.

Common Whale, PENNANT, Brit. Zool. III. p. 50.

Great Mysticete, SHAW, Gen. Zool. II. p. 478, t. ccxxvi.

THE family of the *Balænida*, consisting, as there is now reason to believe, but of two known generic forms, are distinguished by the following characters :—Rivalling the *Physeters* in their huge general dimensions, the head is proportionally much smaller, and the whole form less clumsy. They have no teeth in either jaw ; but the upper, which is extremely narrow, as may be seen in the vignette terminating

this description, is furnished with numerous horny laminae,—the whalebone of commerce, — descending perpendicularly from the palate, and varying in proportional breadth and length in the different species. The structure of this singular apparatus, which forms an admirable strainer for the small food on which these animals live, has been examined by Hunter and many other anatomists, and will be subsequently described. The lower jaw is extremely arched outwards, forming a broad ellipse; the bones themselves are comparatively narrow, not being destined to support teeth, nor to perform any other office requiring strength,—the real object of this structure, and for which it is admirably adapted, being to form an enormous spoon, which serves to enclose and convey to the strainer above, whole shoals of those small crustaceous and medusary animals upon which these immense creatures are nourished. The whalebone, or baleen, as it has been called, consists of numerous parallel laminae, each of which is formed of a central coarse fibrous layer lying between two which are compact and externally polished. The external part does not cover the internal to its extreme edge; the latter appears therefore beyond the former, and terminates in a loose fringed or fibrous extremity. The base of each plate of baleen has a conical cavity, covering a pulp which corresponds with it, and which is imbedded within the substance of the gum or buccal membrane which covers the palate and upper jaw. The outer compact layers of each baleen plate, which have been described, are continuous with a white horny layer of the gum, which passes on to the surface of each plate; and the pulp appears therefore to be the secreting organ of the internal coarser structure only. The filaments of the fringe are very numerous, and fill up the cavity of the mouth sufficiently to form a most complete and efficient strainer; and as the swallow is extremely small, not being large enough to admit even the smaller fish, and the food of these Whales being

consequently restricted to very small animals, such a structure is necessary in order to retain the whole of those which are taken into the mouth. The manner in which the food is taken, then, is as follows:—The whole of the seas of the Arctic regions, no less than those of the more southern climates, abounds in innumerable shoals of molluscous, radiate, and crustaceous animals, which swarm in such hosts as often to colour the surface of the sea. When a Whale, therefore, is taking its food, the immense mouth being opened, a large number are as it were shovelled up by the great expanse of the lower jaw, and as the mouth is closed the water is regurgitated, and the numerous captives are retained by the apparatus just described. When the number of Whales which are found in the Northern Seas and the immense bulk of each individual are considered, imagination itself must fail to appreciate the countless myriads of small beings which are consumed for the nourishment of these stupendous bodies.

This baleen, then, which is furnished in the largest quantities, and of the finest quality, by the *Balæna mysticetus*, is one of its products the value of which renders it an object of the most eager pursuit; but the principal reward of this dangerous and most harassing employment is to be found in the large quantities of oil which are obtained from its thick cutaneous layer of fat, or blubber, as it is usually termed. For this object whole squadrons of vessels are annually sent to the Northern Seas, particularly to Davis's Straits,—a locality for which of late years the coast of Greenland has in a great measure been deserted. It is to the interesting work of Scoresby, himself a long practised and most intelligent participator in those scenes, that we are indebted for the best and fullest account of this perilous service. Into the details of this narration it is not within the scope or object of the present work to enter; but the record of a few of the most prominent facts may not be uninteresting.

Exposed to the most intense cold, often detained long beyond the intended period of their enterprise, and even shut up in the ice for a whole Arctic winter, numbers fall victims to the united effects of cold and hunger; and many are destroyed by shipwreck, occasioned by the irresistible crush of icebergs. But it is from the very act of pursuing and capturing the monster which is the object of their enterprise, that the most frequent and fatal accidents occur. The harpooner is occasionally hurled into the water by the fouling of the rope attached to the instrument with which he has just successfully struck the Whale, which descends with a velocity increased by the pain and terror arising from its wound. At other times the sudden rising of the wounded animal for respiration, his violent movements in the water which his agony occasions, the brandishing of his immense tail, or the whirlpool produced by his rapid sinking, will either of them prove the cause of destruction to the boats which are within his reach.

The quantity of oil and baleen furnished by these monstrous victims to the cupidity of mankind, is, as might be expected, very considerable in the larger individuals. The length of the largest pieces of baleen in a Whale sixty feet in length, is frequently as much as twelve feet, and the blubber of such an one will yield more than twenty tons of pure oil; the proportion of oil to the blubber from which it is extracted being as three to four. The porous bones, particularly the lower jaw, consisting of an almost spongy mass of cells, are also full of pure oil.

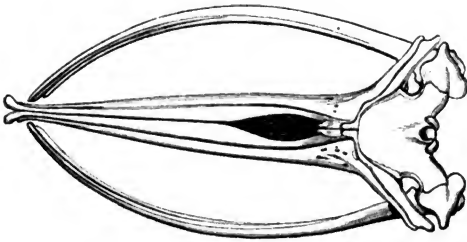
The female of this species, like most others of the Cetacea, is extremely attached to her young, and often rushes into the most imminent danger, and even upon certain death, to rescue or defend it. The whalers take advantage of this affectionate attachment, and strike with their harpoon the young Whale, quite sure that the mother will before long approach

for the purpose of saving her offspring, but too frequently, in fact, to perish with it. The Whale has usually but one young one, and brings forth in the early spring; at birth it is about ten or twelve feet long.

The occurrence of this species in the British Seas has been of late years far less frequent than it appears to have been in former times. "It is," as Mr. Barclay informs me, "occasionally seen on the coast of Zetland; and several of this species have run aground, or have been found dead at sea. These, however, were very lean, either from injury or disease, or from want of food. It is fully ascertained," continues Mr. Barclay, "that this enormous animal subsists exclusively on a species of shrimp with which the Arctic Seas abound; and therefore it cannot be expected to reside long, or to be in a healthy condition, in those latitudes where its only food is wanting altogether."

The usual length of the Common Whale is from fifty to sixty or sixty-five feet, and its greatest circumference from thirty to forty feet. The body is bulky forwards, largest about the middle, and tapers rather suddenly towards the tail. The head is very large, narrow above; very broad, flat, and rounded beneath; it occupies about one-third of the entire length, being about sixteen or twenty feet long, and ten or twelve broad: the lips are five or six feet high; and as the upper jaw bends down at the extremity to close the cavity of the mouth, the line of the meeting of the upper and lower lips appears in front in the form of the letter U. There are no teeth: the laminæ of whalebone which fill the cavity of the mouth are longer in this species than in the Rorqual; they are ranged in two series, consisting of about three hundred in each: the eyes are remarkably small; the external opening of the ears scarcely perceptible; the pectoral fins are of moderate size, and placed about two feet behind the angle of the lips. The tail is of great breadth,

semilunate on its anterior margin, deeply divided in the middle ; the posterior outline sinuous, and the termination of the lobes pointed : the anterior and middle parts of the body nearly cylindrical ; the posterior part rhomboid, the highest ridge or angle being upwards. General colour blackish grey ; the anterior part of the lower jaw, and part of the throat and belly, white.



CETACEA.

BALÆNIDÆ.

Genus, *Balaenoptera*. Lacép.

RORQUAL.

Generic Character.—Head somewhat depressed, rather slender; palate furnished with short plates of baleen; teeth none; a dorsal fin; throat and belly with longitudinal folds.

NORTHERN RORQUAL.

FIN FISH, RAZOR-BACKED WHALE.

Balaenoptera Boops. FLEM.

- | | |
|-----------------------------|--|
| <i>Balæna Boops</i> , | LINN. Syst. Nat. I. p. 106. JENYNS, Brit. Vert. p. 47. |
| ? „ <i>musculus</i> , | Id. l. c. JENYNS, l. c. p. 47. |
| ? „ <i>physalus</i> , | Id. l. c. p. 105. JENYNS, Brit. Vert. p. 47. |
| „ <i>rostrata</i> , | HUNTER, Phil. Trans. 1787, p. 373, t. xx. |
| <i>Balaenoptera Boops</i> , | FLEM. Brit. An. p. 31. |
| „ <i>musculus</i> , | Id. l. c. p. 30. |
| „ <i>Rorqual</i> , | LACEP. Cét. p. 126, t. iii. f. 1. |
| „ <i>Gibbar</i> , | LACEP. Cét. p. 114, t. 4. f. 2. |
| <i>Rorqualus Boops</i> , | FRED. CUV. Cét. p. 321. |
| „ <i>musculus</i> , | Id. l. c. p. 334. |
| „ <i>borealis</i> , | JARDINE, Nat. Libr. (Whales) p. 125, t. v. |
| ? „ <i>minor</i> , | Id. p. 142, t. vii. |

THE inexplicable confusion which has been already observed to exist respecting the reputed species of *Physeter* is not less remarkable in the nomenclature and specific distinctions of the fin-backed Whales of the present family. The existence of true Whales having a dorsal fin, or at least

a protuberance of considerable size upon the back, has been known from the earliest period at which the distinctions of species have been observed and recorded. The Fin-fish was early described by Martens as a distinct species, and has been known as the *Balæna physalus* of Linnæus, and the *Balænoptera Gibbar* of later naturalists. The description and figure of this Whale was however so imperfect, as to offer only a negative character to distinguish it from other fin-backed Whales,—the Rorquals, which are known by the remarkable longitudinal folds of the skin, running along the throat and belly. Martens not having alluded to this peculiarity, of which perhaps he was ignorant, naturalists have subsequently described the Gibbar as a distinct species, and even as a different genus from the Rorquals; but the Baron Cuvier has shown with great clearness that there is not a single positive proof, nor even any reasonable probability, that the *Physalus* differs from the Rorquals. With regard to the latter, two or three species have been assigned by different naturalists to the Northern regions, but, as it appears, without sufficient ground of distinction; nor is there in the present case, more than in the former, any positive and tangible authority for more than one Northern species of Rorqual. Even Scoresby, who speaks of three species, had seen only one, which he has represented in his work. The Pike-headed Whale of Pennant, and that figured by Hunter, a copy of which figure is here given, are doubt-



less the same as the *Boops*. Whether the Mediterranean species, which Fréd. Cuvier has considered as the *Musculus*, be distinct or not, remains yet to be proved; but there is probably no reason for considering the *Musculus* of former authors as any other than *Boops*. The species of the Antarctic Seas appears to be truly distinct; and it is certainly an interesting circumstance that the three great cetaceous forms of the northern regions,—the *Physeter*, or Spermaceti Whale, the *Balæna*, or true Baleen Whale, and the Rorqual, or Fin-backed Whale,—all have their representatives in the Southern Ocean, in distinct species of the same generic forms.

It remains to say a few words respecting an interesting example of a young Rorqual which was taken in the Frith of Forth, and examined by Dr. Knox, who had also the previous opportunity of investigating the anatomical characters, the only certain ones, of the great Rorqual. It is much to be regretted that a more detailed account has not yet appeared of the comparative structure and dimensions of the different parts of these two individuals. The only account which I have seen of the young specimen is contained in Sir William Jardine's Naturalist's Library, and was written, as I believe, by a very intelligent friend of mine: this account is, however, too cursory to be decisive. The only circumstance of importance given is the number of vertebræ, which certainly differs from that of the Rorqual of Hunter, and from that of the large specimen described by Dr. Knox, and again from that of the great Ostend specimen. The following are the numbers of the different vertebræ in the four cases:

	Cervical.	Dorsal.	Remains.	Total.
Hunter's Piked Whale . . .	7	12	27	46
Ostend specimen . . .	7	14	33	54
Dr. Knox's Great Rorqual . .	7	13	43	63
Dr. Knox's R. minor . . .	7	11	30	48

As these individuals, the only ones of which the numbers of the vertebræ are recorded, all differ in this respect, we are obliged either to consider this character as of small or no importance, or to conclude that every one of them belonged to a distinct species. Further and more detailed observations are, in fact, still necessary to remove these difficulties.

The Rorqual differs from the true *Balæna* in the general form of the body, which is more elongated, and particularly in that of the head, which is considerably more slender, and which, instead of the clumsy and obtuse muzzle of the other species, is considerably attenuated. The existence of a dorsal protuberance is another peculiarity to which it owes the generic appellation of *Balanoptera*, or Finned *Balæna*. From this circumstance too it received the common name Gibbar, which, Cuvier suggests, was altered to the French name Jubarte, corrupted by the Northern fishermen into Jupiter-fish; by which it is often designated.

The baleen of the Rorqual is comparatively short; and the blubber is not in sufficient quantity to compensate for the dangers attending the capture of this powerful and active animal. Hence it appears to be generally rather avoided than sought by the fishers.

Its habits are different from those of the Common Whale. It is less quiet and tranquil in its general movements, seldom lying motionless on the surface of the water whilst blowing, but making way at the rate of about five miles an hour. When struck, the velocity of its descent is such as very frequently to break the line, of which Captain Scoresby mentions several instances. Its occurrence on the shores of our islands is not very unfrequent, but in the Northern Seas it is very common. It is often seen off the coast of Zetland and Orkney, and now and then descends to the

more southern parts of our seas. The specimen figured and described by Hunter was caught on the Dogger Bank.

The Rorqual is the largest of all the Whales, and, consequently, of all existing animals. It sometimes reaches the enormous length of eighty, or even a hundred feet. Its food consists not only of the mollusca and smaller crustacea which have been mentioned as constituting the aliment of the *Balæna*, but also of fish of considerable size.

The magnificent skeleton which was exhibited near the King's Mews at Charing Cross some years since belonged to this species; and the figure at the head of this article was taken from that specimen, as soon as it was dead. It was towed into the harbour of Ostend. The following measurements I have taken from Mr. Dewhurst's work on the Cetacea, in which will be found an interesting account of this animal, the largest probably that was ever captured.

	Ft.	In.
Total length	95	0
Breadth	18	0
Length of the head	22	0
Height of the skull	4	6
Length of the spine	69	6
„ of the fins	12	6
Breadth of the tail	22	6

The weight of this individual when captured was 249 tons, or 480,000 pounds; and 4000 gallons of oil were extracted from the blubber.



THE occurrence, on two occasions, of Herbivorous Cetacea being stranded on our coasts, renders it necessary to mention them here ; but as they were in both instances dead, and almost putrid carcasses, drifted by the currents probably from a very distant region, there is no ground for inserting them in the list of British Animals. One of these instances is thus recorded by Mr. Stewart, in his Elements of Natural History :—"The carcass of one of these animals was, in 1785, thrown ashore near Leith. It was much disfigured." Dr. Fleming adds, that he was subsequently informed by Mr. Stewart, that although it had been dead some time, and was putrid, he was able to ascertain the species to be the Manatee, or *Manatus borealis*.

The preceding very imperfect account of the Cetacea which have been found on our coasts, will sufficiently show how little precise and accurate information has hitherto been obtained respecting the characters of the species of this order. Should the present prevailing taste for Zoological science continue to advance, there is, however, reason to hope that some at least of those who command vessels in the Northern Whale Fishery, and of whom many are men of intelligence, may be induced to direct more of their attention to the Zoological treasures which surround them, and to make correct and available notes of the characters, the dimensions, and the habits of a group of animals which is at present in a state of the most inextricable ambiguity and confusion. It is not to be expected, nor indeed would it be possible, that much could thus be added to our anatomical

information ; but a series of comparative notes on all the external characters, drawn up with the requisite degree of precision both of nomenclature and style, would be invaluable, and would probably lead to many interesting conclusions on the geographical range of these oceanic monsters, as well as to a correct knowledge of their habits, their zoological arrangement, and their mutual relations.



THE END.

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